

National Transport Authority (NTA)

DASHBOARDS

Sub-title



National Transport Authority (NTA)

DASHBOARDS

FINAL REPORT (VERSION 1.0) CONFIDENTIAL

PROJECT NO. 70081919

OUR REF. NO. 70081919

DATE: NOVEMBER 2022

WSP

WSP House
70 Chancery Lane
London
WC2A 1AF

Phone: +44 20 7314 5000



Fax: +44 20 7314 5111


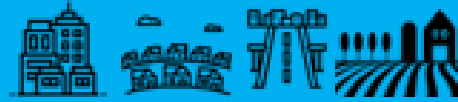
WSP.com





DASHBOARDS



The following dashboards provide a concise overview of the different measures and their relevance for being pursued across the Greater Dublin Area (GDA). This includes reference to freight objectives.

DRAFT - Not for Circulation



ALTERNATIVE VEHICLE FUELS		Mode Relevance		Freight Sector	Road (Haulage/Courier)	4 Rs	Re-mode	Technical Maturity	Initial real-world operation	Commercial Maturity:	Operating commercially
Definition: [Trajectory]	The use of alternative fuels and drivetrains to traditional diesel and petrol internal combustion engines is helping to reduce vehicle emissions. A range of alternatives are in development including battery electric vehicles (BEVs) and Hydrogen vehicles, as well as biofuels and Compressed Natural Gas (CNG). Alternative fuels are essential in the decarbonisation of freight transport and in reducing the public health impact of harmful exhaust emissions. However, for alternative fuels to become mainstream, there is a significant infrastructure needed to enable seamless commercial operation.							Category	Cleaner Transport		
								Geographical Applicability:			
Best Practice	Use Cases										
	Tesla Tesla Semi [Battery electric truck]	The Tesla Semi is an all-electric battery-powered Class 8 semi-truck in development by Tesla, Inc. Two concept vehicles were unveiled in November 2017, and production in 2021 is planned. ... Tesla CEO Elon Musk said that the Semi would come standard with Tesla Autopilot that allows semi-autonomous driving on highways. Electric energy costs are half those of diesel. With fewer systems to maintain, the Tesla Semi provides \$200,000+ in fuel savings and a two-year payback period. The long range version can cover 500 miles on a single charge when fully laden.									
	Nikola Nikola Two [Fuel cell electric vehicle]	Hydrogen-powered vehicles use fuel cells to convert Hydrogen and Oxygen into electricity and water. The electricity drives electric motors to propel the vehicle. The major benefit of Hydrogen over electrification is its flexibility. A Hydrogen truck can be refuelled in approximately the same time as a diesel truck and the operating range and operating patterns are similar meaning that Hydrogen-powered trucks could fit into the existing logistics system without too much change. However, Hydrogen is much more energy intensive than electricity and consequently is inherently more expensive for the economy, the environment and probably for the vehicle operator.									
	Scania Bioethanol trucks [Biofuel vehicle]	Biogas is the most commercially viable way to reduce CO2 emissions for transport. It provides cleaner, greener and quieter operation with significantly lower costs than those associated with hybrid, electric or hydrogen options. It's a completely natural, sustainable and renewable fuel source, and it's available now. Biogas is produced by the natural breakdown of food and sewage waste. It uses a process called anaerobic digestion to split waste material into gas (biofuel) and solids (bio fertilizer).									
	Waitrose CNG HGVs	Waitrose is expected to order 40-60 new Bio-CNG trucks every year until the HGV fleet is 100% Bio-CNG by 2027/28. Operating dedicated gas trucks has transitioned from being a trial, to being 'business as usual', with positives on carbon reduction, driver acceptance and cost. Waitrose have saved up to 40% on their fuel bill by making the switch to Bio-CNG with new stations being developed. The fuel is 100% renewable whilst the transition across has also had positive repercussions on noise pollution from running HGV fleets.									
Opportunities	Pairing with renewable energy generation to create net zero carbon logistics, creating refuelling/recharging hubs around sites such as ports and warehousing sites which generate a lot of HGV trips										
Barriers	Conversion of fleets currently limited by production capacity for BEVs and H2, Infrastructure not yet there for heavy duty use cases, BEVs may not fit into existing service patterns										
Local Relevancy	HGV & LGV traffic is unlikely to subside because of the dependency on road freight for accessing major trip attractors across the GDA. Larger third-party logistics companies stationed around the M50 and burgeoning industrial/logistics parks with large LGV fleets should be the trailblazers for EV technology. The shift towards hydrogen and CNG should also be led by larger fleet operators, especially those carrying regional consignments along the primary route network; providing infrastructure can be located at strategic locations (Dublin Inland Port, N7/M7). Forecast rise in RO-RO services at Dublin Port, for example, will likely increase flows of HGVs so failure to support the transition may exacerbate local air pollution.										
Impact on Freight Objectives											
Economy			Environment				Society				
Freight efficiency Improved journey times, optimised use of fleets, delay mitigation and improved supply chain connectivity to save time and costs		Med	Air quality Reduce the impact of the sector through air quality improvements and a reduction in other forms of pollution and intrusive activities			Max	Safety Improve the safety of the sector to reduce the number of accidents involving goods vehicles (particularly linked to vulnerable users)			Min	
Industry contribution Improved jobs and opportunities to address skills shortages, support for inward investment, land availability, infrastructure provision		Med	Greenhouse gas emissions Reduction in greenhouse gas emissions from the sector to achieve net-zero by 2050			Max	Community disturbance Reduce the impact of freight on communities, noise levels, air quality and informal overnight lorry parking			Med	
Connectivity Improved connectivity seamless intermodal activity to support local, national and international freight movements across the area		Min	Urban realm Minimising the intrusive impact of freight transport on visual amenity and local, protected settings			Med	Placemaking Better integrate freight into land use planning, development, construction and servicing plans, better freight data			Min	



CHARGING/FUEL INFRASTRUCTURE		Mode Relevance		Freight Sector	All sectors	4Rs	Re-mode	Technical Maturity	Initial real-world operation	Commercial Maturity:	Operating commercially
Definition: [Trajectory]	Charging or fuel infrastructure is a core component of a healthy transport ecosystem and requires adequate planning and dedicated facilities and energy/utility networks connected into a distribution grid. Electric Vehicle charging networks have grown substantially in recent years through public and private investment to serve the road freight sector alongside an emergence of hydrogen stations serving HGVs; the latter of which is growing in popularity. Compressed Natural Gas (CNG) is increasingly viewed as the short-term option to help decarbonise the freight sector quickly and efficiently with a network required to support uptake.							Category	Cleaner Transport		
								Geographical Applicability:			
Best Practice	Use Cases										
	EV Charging Network Wien Energie [Vienna]	Roll out of public EV charging network in the capital over three years with over 1,000 stations now developed and used over 320,000 times since installation began in 2017. This is part of their mission 2030 to be carbon neutral within the decade. Additional 'demand orientated' stations are also being installed whilst the 'basic network' covering mainly fast chargers, will be complemented by additional rapid chargers across the city to support the shift towards electric vehicles and tie in with wider micromobility schemes									
	Hydrogen Fuelling Station, BOC [Aberdeen]	Aberdeen City Council install a tailored, hydrogen refuelling station at the Kittybrewster bus depot which has been upgraded periodically to cater for a greater range of vehicles, including vans & HGVs. The site has the capacity to produce 360kg of hydrogen daily; enough for the current fleet of 10 x 42-seat buses to travel up to 350km each day. Over a four-year period, a small fleet of 10 buses (or equivalent sized vehicles) saved over 1,000 tonnes of carbon dioxide compared to running the latest Euro 6 diesel engines, helping to improve air quality in the city.									
	Electric Highway Ecotricity [UK]	Ecotricity, in partnership with Nissan, has installed strategically placed electric vehicle rapid-charging infrastructure at over half the UK's motorway service stations to help address "range anxiety", one of the barriers to electric vehicle adoption. This involved working with various service station providers to fuel vehicles in quick time; all powered through renewable energy sources to power longer distances journeys.									
	CNG Network Foresight Group [UK]	CNG Fuels opened its fifth refuelling station near Birmingham last week, and the funding will see it develop at least 14 further public access stations on major routes over the next two years, quadrupling the company's capacity and enabling it to refuel 8,000 vehicles a day. The fuel is 35%-40% cheaper than diesel and cuts vehicle greenhouse gas emissions by up to 85%. CNG Fuels has secured a pipeline of development sites on major trucking routes to serve fleet operators throughout Great Britain. Stations due to open next year include major trucking hotspots such as Eurocentral, near Glasgow, Milton Keynes, Avonmouth and Wakefield.									
Opportunities	The key ingredient for a quick transition towards a zero-carbon future with additional charge points facilitating the expansion of additional vehicle sales and volumes.										
Barriers	Investment and support from national government towards decarbonising transport and providing the road freight sector with the time and incentive to make the transition.										
Local Relevancy	Highly relevant in Ireland with progress already underway to establish a network by Gas Works Ireland. One is currently present within Dublin Port and 7 are planned across the GDA with additional fuelling stations being sight at major trip attractors and servicing larger fleet operators travelling along radial route along the primary route network outside of (and on) the M50. Low processing, transportation and electricity costs make it a low-cost, clean solution which can be scaled up quickly to aid the freight sector to transition towards zero carbon quickly.										
Impact on Freight Objectives											
Economy			Environment				Society				
Freight efficiency Improved journey times, optimised use of fleets, delay mitigation and improved supply chain connectivity to save time and costs		Max	Air quality Reduce the impact of the sector through air quality improvements and a reduction in other forms of pollution and intrusive activities		Max	Safety Improve the safety of the sector to reduce the number of accidents involving goods vehicles (particularly linked to vulnerable users)		Min			
Industry contribution Improved jobs and opportunities to address skills shortages, support for inward investment, land availability, infrastructure provision		Med	Greenhouse gas emissions Reduction in greenhouse gas emissions from the sector to achieve net-zero by 2050		Max	Community disturbance Reduce the impact of freight on communities, noise levels, air quality and informal overnight lorry parking		Min			
Connectivity Improved connectivity seamless intermodal activity to support local, national and international freight movements across the area		Med	Urban realm Minimising the intrusive impact of freight transport on visual amenity and local, protected settings		Med	Placemaking Better integrate freight into land use planning, development, construction and servicing plans, better freight data		Max			


CARGO HANDLING EQUIPMENT		Mode Relevance	 	Freight Sector	Rail, Sea (Ports/IWW)	4Rs	Re-duce, Re-mode	Technical Maturity	Technical operation	Commercial Maturity:	New commercial operation
Definition: [Trajectory]	Cargo Handling Equipment is the provision of off-road, self-propelled vehicle or equipment used in the context of an intermodal rail yard or port/dock facility to lift or move container, bulk, or liquid cargo carried by ship, train, or another vehicle. Cargo handling equipment is still largely diesel-based and involves a lot of CO2 emissions with equipment, including reach stackers and empty container handlers – contributing almost a quarter of the total emissions attributed to a site. Handling goods can also be noisy and contribute towards sound pollution which can have a disproportionate impact on local neighbourhoods.							Category		Cleaner Transport	
								Geographical Applicability:		 	
Best Practice		Use Cases									
	Electric Top Handlers Everport Terminal [Los Angeles]	As part of the Everport Advanced Cargo Handling Demonstration Project, the world's first zero-emission battery-electric top handlers will be tested at a California container terminal as part of a port's drive for clean cargo-handling operations. The battery-electric top handlers, which are off-road vehicles with an overhead boom for loading containers, run on a one-megawatt battery designed to operate for up to 18 hours between charges. Each top handler has a data logger for tracking hours of operation, charging frequency, energy usage and other performance indicators. The port aims to advance commercially feasible solutions to meet its goal of transitioning all cargo-handling equipment to zero emissions by 2030.									
	Hydrogen Container Yard Crane, KICT [Japan]	A new near zero-emission (NZE) rubber-tired gantry (RTG) container yard crane is being piloted at the MOL-operated Kobe International Container Terminal (KICT). The model seeks to improves fuel consumption by 20-30% and reduces emissions of CO2 and other harmful substances in diesel exhaust in comparison with conventional fuels. The introduction of the NZE RTG matches the concept of Carbon Neutral Port (CNP), which is an initiative of Japan's Ministry of Land, Infrastructure, Transport and Tourism aimed at achieving decarbonization in ports and harbours									
	Renewable Diesel Fuel Fenix Marine Services [Los Angeles]	The Fenix Marine Services, a container terminal at the Port of Los Angeles that handles 2m containers a year, has transitioned its entire fleet of more than 300 pieces of container-handling equipment, as well as some support vehicles, from fossil-based diesel fuel to renewable diesel fuel, a blend made 80% of recycled organic oils and animal fats, and 20% of biomass. Fenix has been able to immediately and significantly reduce its harmful emissions while also minimizing its costs and the time required for such a transformation. The change does not require any modifications to the equipment and can simply replace conventional fuels. This is taking place alongside a trial of five hydrogen-fuelled heavy-duty trucks, two battery-electric yard tractors, and two battery-electric forklifts through the Shore 2 Shore project.									
Opportunities		New equipment is being trialled globally and introduced as a key way for ports and rail yards to reduce emissions, with wider benefits to society from lower noise pollution.									
Barriers		Making the transition towards electric or hydrogen fuelled handling equipment will require investment in fuelling infrastructure on site. This will take time.									
Local Relevancy		Dublin Port is exploring automated and electrically powered cargo handling equipment as part of its 2040 masterplan are using a combination of primary and secondary handling equipment to ensure the quick turnaround of ships and better use of the space available within the Port. Space is a key constraint, but future investment could look to upgrade equipment to reduce emissions. Future investment in railheads and IWW infrastructure (mini ports) could look to go green with these likely to require <u>less</u> substantial mechanisms and capital costs for investment.									
Impact on Freight Objectives											
Economy			Environment				Society				
Freight efficiency Improved journey times, optimised use of fleets, delay mitigation and improved supply chain connectivity to save time and costs		Max	Air quality Reduce the impact of the sector through air quality improvements and a reduction in other forms of pollution and intrusive activities			Max	Safety Improve the safety of the sector to reduce the number of accidents involving goods vehicles			Min	
Industry contribution Improved jobs and opportunities to address skills shortages, support for inward investment, land availability, infrastructure provision		Min	Greenhouse gas emissions Reduction in greenhouse gas emissions from the sector to achieve net-zero by 2050			Max	Community disturbance Reduce the impact of freight on communities, noise levels, air quality and informal overnight lorry parking			Max	
Connectivity Improved connectivity seamless intermodal activity to support local, national and international freight movements across the area		Max	Urban realm Minimising the intrusive impact of freight transport on visual amenity and local, protected settings			Min	Placemaking Better integrate freight into land use planning, development, construction and servicing plans, better freight data			Min	




E-CARGO BIKES		Mode Relevance			Freight Sector	Last Mile Logistics	4Rs	Re-mode	Technical Maturity	Initial real-world operation	Commercial Maturity:	Operating commercially
Definition: [Trajectory]	Electric cargo bikes are a highly versatile form of first and last mile freight transportation that can replace deliveries in urban areas traditionally made by light goods vehicles (LGVs), whilst using a fraction of the roadspace. Being electrically assisted, they enable the rider to efficiently transport cargo with zero emissions at street level, with some variants able to carry loads of 250kgs+. Additionally, where infrastructure allows, they can use the cycling network to efficiently move around a city and their smaller size allows them to be parked more conveniently near to their destination and to have access to pedestrianised areas.								Category		New Modes	
									Geographical Applicability:			
Best Practice		Use Cases										
	Outspoken Cycles Zedify [UK]	Zedify use a fleet of zero emission cargo bicycles and tricycles, supplemented by electric vans, that operate out of small urban logistics hubs to fulfil deliveries and collections in urban areas. At the hubs, items are sorted into local, digitally-tracked delivery rounds and sent to their final addresses by specially adapted cargo bikes carrying up to 250kg – or electric vans for longer distances, if needed. Clients include online retailers, logistics carriers, as well as local businesses for ‘across town’ same day deliveries. They currently operate in 9 UK cities, including Cambridge, London, Edinburgh, Glasgow and most recently in Bristol										
	DHL City Hub [Utrecht, Netherlands]	DHL Express is piloting a new City Hub concept that will enable increased use of cargo bicycles for inner-city deliveries. The City Hub is a customised trailer which can carry up to four containers for the DHL Cubicycle, a customised cargo bicycle which can carry a container with a load of up to 125 kg (one cubic meter in volume). A DHL van delivers the trailer into the city centre, where the containers can be quickly loaded on to two Cubicycles for last-mile inner-city delivery. It can then be reloaded for outbound shipments. DHL Express has already replaced up to 60% of inner-city vehicle routes in some European countries with cargo bicycles and they plan to roll out the approach more widely over the next 3-5 years.										
	Hereford Pedicabs Pedicargo [Hereford]	Hereford PediCargo collect business waste for recycling on a weekly or ad hoc basis. They use cargo trikes and deployable trailer bins to gather the city’s paper, cardboard and plastic and then shred, compact and send it for recycling. The service is then invoiced at the end of the month to collect cash from the clients. Having diversified from a pedicab service after identifying a lack of trade waste recycling facilities in Hereford, they now provide an easy way to recycle waste, much of which would ordinarily go to landfill despite 80% of the waste being recyclable. Having rapidly grown, they now operate a fleet of e-cargo bikes and prevent over 10,000kg of recyclable waste from going to landfill every week.										
Major Market Failures		General Challenges	Previous work has identified that e-cargo bike operators face a number of challenges which affect their ability to compete with traditional van traffic. Firstly, in logistics, e-cargo bike operators are subject to strong downward price pressures and the margins in logistics are quite slim, making expedient or risky investments very difficult. Furthermore, as a relatively new mode, there is a limited market for e-cargo bikes and many models haven’t gone through the same rigorous testing processes as ordinary bikes. This leads to issues with reliability and increases costs, especially given that some larger models can cost in excess of £10,000. Whilst e-cargo bikes are highly versatile, clearly much larger modes are out of scope. This can result in partners needing to manage two separate operators, which often proves too costly or time-consuming.									
Opportunities		Links to micro-consolidation centres and mobility hubs, logistics centred development										
Barriers		Limited to a small geography, cannot carry some larger loads, not suited to all locations, dependent to a degree on urban form										
Local Relevancy		Dublin has over 200km of cycle network and although there are issues with its attractiveness and coherence (to be addressed through planned investment), it offers the opportunity to support the safe and efficient movement of goods by bike. E cargo bikes are likely to have a competitive advantage over other vehicles especially where measures are introduced to limit and restrict vehicle access (pedestrianisation, timed closures or a CAZ) whilst there are plentiful opportunities for established couriers and third part logistics providers to remode from new and potential consolidation points within the cordon area defined by the current HGV Management Strategy. E cargo bikes can form part of a more intermodal freight system within an urban setting; delivering over the last mile and supporting reverse logistics whilst they can have relevance in smaller towns across the GDA through ‘only mile’ schemes.										
Impact on Freight Objectives												
Economy				Environment				Society				
Freight efficiency			Max	Air quality			Max	Safety			Max	
Improved journey times, optimised use of fleets, delay mitigation and improved supply chain connectivity to save time and costs				Reduce the impact of the sector through air quality improvements and a reduction in other forms of pollution and intrusive activities				Improve the safety of the sector to reduce the number of accidents involving goods vehicles				
Industry contribution				Greenhouse gas emissions				Community disturbance				
Improved jobs and opportunities to address skills shortages, support for inward investment, land availability, infrastructure provision			Max	Reduction in greenhouse gas emissions from the sector to achieve net-zero by 2050			Max	Reduce the impact of freight on communities, noise levels, air quality and informal overnight lorry parking			Max	
Connectivity			Max	Urban realm			Max	Placemaking			Max	
Improved connectivity seamless intermodal activity to support local, national and international freight movements across the area				Minimising the intrusive impact of freight transport on visual amenity and local, protected settings				Better integrate freight into land use planning, development, construction and servicing plans, better freight data				



WATERBOURNE FREIGHT		Modes Relevance		 	Freight Sector	Haulage	4Rs	Re-mode	Technical Maturity	Technical operation	Commercial Maturity:	Commercial Operation
Definition: [Trajectory]	A city's waterways are often an underutilised asset and yet, whilst the roads are increasingly congested, the rivers and canals experience very little traffic and run right through the heart of many of our towns and cities. There is an opportunity to connect transport networks and watersides for goods transshipment without needing to interface with road traffic. Equally, waterbourne freight can be used for accessing hard to reach areas inaccessible for other vehicles and can be used as compounds for construction activity taking place canalside or adjacent to river courses. Waterbourne freight is apt at carrying non-time dependent, non-perishable bulky goods (such as aggregate materials) or abnormal loads with affiliated infrastructure required for goods handling and storage.								Category		New Modes	
									Geographical Applicability:			
Best Practice		Use Cases										
	River Barges Vert chez Vous [Paris]	An intermodal example of using low emission vehicles, combining barges and e-tricycles to deliver 2,500 packages each day. The ship doubles up as floating 'mobile' warehouse that cruises on the river Seine, with 5 pre-set stops per day with seamless transition and handling of goods between modes. Each trike has a 2m cargo hold, while the barge holds 120m, so a total of 60 full bike loads can be delivered each day. Space constraints put additional value on a moving warehouse as more stops can be made per day.										
	Green Highway Ship Canal [Manchester]	The Port of Liverpool and the Manchester Ship Canal are jointly owned and managed by Peel Ports and now handle more than 40 million tonnes of cargo and 15,000 ship movements. A canal barge service linking Liverpool and Manchester serves as a 'green highway' and provides an alternative to the congested motorway network in the North West; with each journey equating to a saving of 180kgs of CO2 emissions, with the potential to save an additional 2,000 tonnes of CO2 per annum. Until recently the service carried only containers, but the carriage of a giant chemical tank to a facility at Runcorn saw the start of non-containerised traffic										
	Aggregate Shipments Hanson, Grand Canal [London]	The shipment of 450,000 tonnes of aggregate started in 2003 as part of a new initiative to move sand and gravel by water and avoid using congested local roads (with width restrictions also in place) from the gravel pit to a canalside concrete making plant owned by Hanson, the international construction materials group at Stockley Park, West London. Up to 60,000 tonnes was move by four crafts annually over a distance of 5 miles: with sometimes two journeys a day. This culminated into taking off 6,000 lorry movements off the network each year.										
Major Market Failures	New Lock System Albert Canal [Belgium]	The Albert canal, located in the eastern part of Flanders and used as a vital connection between industrial zones around Liege with the harbour of Antwerp, recently invested in new lock systems and developed a dependency on the Meuse Basin to receive water for the sluice gates. As a consequence of climate change, it is projected that there will be extensions to the discharge time for water to feed through the sluices to feed into the canal system to support navigation of ships along its course.										
Opportunities	Increasingly popular as a cost-effective means for transporting bulkier goods and removing HGV traffic from sensitive and hard to reach urban areas. Can integrate with other land uses and transport networks.											
Barriers	Does require handling and canal/riverside infrastructure (mini ports) and enhanced integration with portside facilities (if required). River and canals must be navigable and future proofed for long term use											
Local Relevancy	The GDA has a number of navigable watercourses that are underutilised for freight transport; despite them being originally built to serve this purpose. Whilst there is currently a lack of integration and dedicated provision to support waterbourne freight and transshipment/goods handling between modes, the Grand Canal and the River Liffey are radial in nature; connecting the hinterlands of the GDA to the core of Dublin. Waterbourne freight could refer to carrying aggregate and construction materials (bulky loads) with higher capacity loads, at a slow pace that avoids congestion and reduces HGV volumes between compounds on the edge of the GDA/Dublin, through to smaller consignments of parcels and more time critical deliveries using passenger services and last mile deliveries by e-cargo bike. Waterbourne freight has huge scope to reduce HGV movements destined for the city centre and potential to connect into port infrastructure for delivery of consignments within the M50 boundary.											
Impact on Freight Objectives												
Economy			Environment					Society				
Freight efficiency		Max	Air quality		Max	Safety		Max				
Improved journey times, optimised use of fleets, delay mitigation and improved supply chain connectivity to save time and costs			Reduce the impact of the sector through air quality improvements and a reduction in other forms of pollution and intrusive activities			Improve the safety of the sector to reduce the number of accidents involving goods vehicles						
Industry contribution		Med	Greenhouse gas emissions		Med	Community disturbance		Med				
Improved jobs and opportunities to address skills shortages, support for inward investment, land availability, infrastructure provision			Reduction in greenhouse gas emissions from the sector to achieve net-zero by 2050			Reduce the impact of freight on communities, noise levels, air quality and informal overnight lorry parking						
Connectivity		Max	Urban realm		Max	Placemaking						
Improved connectivity seamless intermodal activity to support local, national and international freight movements across the area			Minimising the intrusive impact of freight transport on visual amenity and local, protected settings			Better integrate freight into land use planning, development, construction and servicing plans, better freight data						



FREIGHT ON PUBLIC TRANSPORT		Modes Relevance		Freight Sector	Haulage/ Courier	4Rs	Re-mode, Re-time, Re-duce	Technical Maturity	Technical operation	Commercial Maturity:	Commercial Operation
Definition: [Trajectory]	Train stations act as major transport interchanges and offer unparalleled direct access to city centres and low journey times compared to travel by road. This is a benefit to logistics as it is to passengers and could allow e cargo bikes to collect parcels offloaded from trains for onward delivery. Similarly, buses are running below capacity and supplementing the movement of people with freight would add another much-needed revenue stream and it would in turn improve the experience for passengers. The routing algorithms that underpin DDRT could factor in both people and freight to create the most efficient routes that do not compromise on customer experience or journey times.							Category	New Modes		
								Geographical Applicability:			
Best Practice	Use Cases										
	GB Railfreight Freight trail [UK]	UK rail freight operator GB Railfreight has taken a leaf out of the air cargo industry playbook and converted a commuter train to carry express freight to London. The company completed a trial shipment of NHS supplies on a passenger train on the West Midlands to London route in 2020, and said that with minor interior modifications, it could be loaded in both dedicated freight terminals or platform-side in any town or city that has a station and appropriate road access. The train was loaded with cages that can each carry 200kg of packages and parcels. The test was to ensure that the cages could be loaded/unloaded from the trains existing door arrangement, with minimal modifications, and to see how many of the parcel cages could be conveyed within each vehicle with seating removed or a modified seating arrangement."									
	HobbyDB PostBus [Switzerland]	PostBus Switzerland is a subsidiary company of the Swiss Post, which provides regional and rural bus services throughout Switzerland, and also in France and Liechtenstein. Whilst post and passengers are mostly separate in Switzerland, the PostBus still exists to connect to post offices in peripheral regions. The federal law and the Swiss Constitution stipulate that every village with a population greater than 40 is entitled to regular bus services. The frequency of these services is in direct proportion to the population density, however, for the most remote communities, combining postal and passenger movements makes commercial sense.									
	Greyhound Greyhound Freight [Australia]	Using the Greyhound Coach network, and available space on coaches, the Greyhound Freight division delivers over 220,000 freight items each year from major capital cities and country towns to the most remote places in Australia. Greyhound Freight offers competitive rates, and as parcels travel on regular scheduled services, and there is no need to wait for a full freight load to depart. As soon as freight has been received in their depot, it departs on the next available coach service.									
Major Market Failures	Royal Mail Postbus [UK, Historic]	Royal Mail postbuses used to be a common sight in some rural areas across the United Kingdom, most notably across the Yorkshire Dales and South West Scotland, but as the needs of passengers and freight diverged, so did the respective services. The postbus was originally created to replace rapidly declining local bus and rail services across remote locations where they sometimes served as the only form of public transportation, running once or twice a day. Even as recently as 2006 there were more than 200 services running.									
Opportunities	Creating consolidation hubs at rail stations to create a modal interchange for goods for onward delivery by last mile modes										
Barriers	Regulatory barriers to moving freight alongside passengers, security concerns										
Local Relevancy	This is an area that has not yet been explored to any extent across the GDA but would align with the expansion of transport networks and service provision (e.g. Dart, Laus Line etc.). Emerging from the pandemic, many operators will be exploring new revenue streams to complement a core, but reduced commuter and leisure offer. The density of rail and tram connections and improvements to bus provision and priority along arterial routes radiating from Dublin is particularly conducive to shipping goods efficiently; with first & last mile logistics in place to transfer goods (parcels) between origins and destinations. This would supplement the scaling up of e cargo bike whilst freight on public transport would apply to reaching out into rural hinterlands; saving suppliers of goods and <u>third-party</u> logistics suppliers significant costs from consolidating/dovetailing pre-existing vehicle services										
Impact on Freight Objectives											
Economy			Environment				Society				
Freight efficiency		Max	Air quality		Max	Safety		Improve the safety of the sector to reduce the number of accidents involving goods vehicles		Min	
Improved journey times, optimised use of fleets, delay mitigation and improved supply chain connectivity to save time and costs			Reduce the impact of the sector through air quality improvements and a reduction in other forms of pollution and intrusive activities								
Industry contribution		Med	Greenhouse gas emissions		Med	Community disturbance		Reduce the impact of freight on communities, noise levels, air quality and informal overnight lorry parking		Min	
Improved jobs and opportunities to address skills shortages, support for inward investment, land availability, infrastructure provision			Reduction in greenhouse gas emissions from the sector to achieve net-zero by 2050								
Connectivity		Max	Urban realm		Med	Placemaking		Better integrate freight into land use planning, development, construction and servicing plans, better freight data		Min	
Improved connectivity seamless intermodal activity to support local, national and international freight movements across the area			Minimising the intrusive impact of freight transport on visual amenity and local, protected settings								








PORT SIDE BOOKING SYSTEM		Mode Relevance		Freight Sector	Container Haulage (Freight Forwarding)	4 Rs	Re-time	Technical Maturity	Mature technical operation	Commercial Maturity:	Mature commercial operation
Definition: [Trajectory]	Bottlenecks, producing truck congestion inside and outside the terminal, can lead to serious local environmental problems such as noise and harmful emissions, but also to major inefficiencies in various operations. The main cause of truck congestion is the fluctuating arrival pattern of trucks. This results in a situation where demand significantly exceeds supply or vice versa. Truck appointment systems (TAS) allow ports to reduce peaks in truck arrivals. Thereby, the operation costs for terminals and the waiting times for trucking companies are reduced							Category		Data and Connectivity	
								Geographical Applicability:			
Best Practice		Use Cases									
	1-Stop Vehicle Booking System (VBS) [Australasia / SE Asia]	VBS was developed to drive efficiencies by addressing the common issues shared by port communities around the world – the lack of transparent information flow, under-utilisation of equipment and inefficient practices. VBS allows terminal operators to match terminal resources with landside demand. Terminals can configure timeslots, work-day calendars and business rules, and create and maintain customer details. For example, when the quayside is busy, landside resources can be adjusted to support best use of equipment. Equally, when quayside activity is lower, landside operations can be ramped up to support clearing for the next vessel arrival.									
	Terminal Appointment Booking System [Manila, Philippines]	Manila's two main terminals have launched a vehicle booking system that is expected to improve container flows into and out of the port as the Philippines' peak shipping season approaches. The Terminal Appointment Booking System, or TABS, was a response to the truck ban and road policies that were introduced by the local government in 2014 to combat the traffic congestion in Manila but only served to bring the port to a complete standstill with vessel delays often measured in weeks. TABS will also allow the terminals to better manage their port capacity and ensure the resources are in place to handle more predictable volumes and scheduling.									
	DP World QLess [Antwerp, Germany]	Between 1,400 to 2,400 trucks funnel through the Antwerp Gateway Terminal each day which creates large lines of idling vehicles waiting to drop off or retrieve cargo. As soon as the vehicle booking system for terminal capacity management was implemented, the port experienced massive improvements: Firstly, all truck lines have been eliminated. As a result, exchange areas are always now reachable because there are not hundreds of trucks blocking common areas. Additionally, traffic jams leading in and out of the port have been eradicated. Truck drivers now avoid wasting hours a day waiting in line which, within the first year of the new queuing system, is expected to result in eliminating at least 730,000 kilograms of CO2.									
Major Market Failures	Hutchison Port of Felixstowe [UK]	The UK's largest container port, Port of Felixstowe, is making some significant changes to its troubled vehicle booking system (VBS) following criticism from the British International Freight Association to try to prevent container collection slots for box hauliers and freight forwarders being wasted. The failure of the system has come about as a result of a poorly migration to the new systems and a spike in demand for the movement of containers. A statement from BIFA read "BIFA members have suffered from two years of poor service from the port, and we feel that there is a need for independent intervention by government to address the many issues faced by the port's users."									
Opportunities	Integration with real-time fleet management systems to enable flexible scheduling dependent on slot availability to reduce waiting time. Active routing of drayage trucks through the port based on internal traffic.										
Barriers	Most actors of the port community are small-sized, and struggle to fund the investment for developing or modifying their systems for connecting to the booking system										
Local Relevancy	The management of vehicle access to Dublin Port (the focus area for this measure) complements the development of Dublin Inland Port and the recognition that Dublin Port Tunnel carries a substantial volume of freight traffic now with future forecasting likely to put huge constraints on capacity. A booking system that enables hauliers and freight forwarders to better plan journeys and provides Dublin Port Company (DPC) to better utilise and manage limited on-site space, will help bring benefits to journey times, reduce backlogs and improve the overall transshipment experience between road and sea. A booking system, featuring clear guidance on customs procedures and live traffic information, could be equally applicable for other sea ports (Drogheda and Wicklow).										
Impact on Freight Objectives											
Economy				Environment				Society			
Freight efficiency Improved journey times, optimised use of fleets, delay mitigation and improved supply chain connectivity to save time and costs			Max	Air quality Reduce the impact of the sector through air quality improvements and a reduction in other forms of pollution and intrusive activities			Med	Safety Improve the safety of the sector to reduce the number of accidents involving goods vehicles			Min
Industry contribution Improved jobs and opportunities to address skills shortages, support for inward investment, land availability, infrastructure provision			Min	Greenhouse gas emissions Reduction in greenhouse gas emissions from the sector to achieve net-zero by 2050			Med	Community disturbance Reduce the impact of freight on communities, noise levels, air quality and informal overnight lorry parking			Min
Connectivity Improved connectivity seamless intermodal activity to support local, national and international freight movements across the area			Max	Urban realm Minimising the intrusive impact of freight transport on visual amenity and local, protected settings			Med	Placemaking Better integrate freight into land use planning, development, construction and servicing plans, better freight data			Min


TELEMATICS		Mode Relevance	All freight modes	Freight Sector	Road (Haulage/Courier)	4 Rs	Re-route, Re-time	Technical Maturity	Mature technical operation	Commercial Maturity:	Mature commercial operation
Definition: [Trajectory]	Fleet management tools can provide real-time visibility into fleet operations while increasing driver satisfaction and decreasing fuel usage through predictive analytics and accurate reporting. It also helps fleet managers ensure that their operations are adhering to the complex regulations governing the industry. Fleet management can also improve operational efficiency by assigning and dispatching routes to drivers in real-time to ensure accurate pickups, deliveries and returns. Solutions include hazard alert services, delivery tracking, and dynamic routing							Category		Data and Connectivity	
								Geographical Applicability:			
Best Practice	Use Cases										
	GeoTab Gnewt [London, UK]	has the UK's largest fully electric commercial vehicle fleet. Delivering zero-emission final mile logistics for retailers and third-party logistics companies, Gnewt's fleet of double payload modified vans has transformed green deliveries in London – growing from just a handful of vans into the UK's largest all-electric fleet. Gnewt needed to optimise its operations in order to compete with ICE delivery companies which were often cheaper. To add to this, there are charging limitations with only a finite amount of power coming into its charging depot. Only 35 vehicles a day could be fully charged at first. To combat these constraints, drive greater scalability, and provide a platform for future innovation, Gnewt needed a telematics solution that could transform how it views and models its fleet's charging operations – one that could directly feed in vital intelligence on vehicle state of charge									
	OptimoRoute [Software]	OptimoRoute enables users to optimise for the best routes & schedules while respecting all order and task criteria: priority, time windows, day of week, date range, reverse logistics orders, variable job durations vehicle matching (e.g. loading ramp/refrigeration). List minute orders can be integrated into route plans and automatically recalculated to reflect manual changes. It also integrates with delivery systems to provide proof of delivery, capturing digital signatures and sending messages to customers informing them when the driver is scheduled to arrive.									
	E-cargo bikes Zedify [UK, Nationwide]	Zedify built their own robust, efficient technology platform that addresses the specific demands of providing predominantly cargo bike based city logistics. Routes are optimised daily meaning deliveries are made as quickly and efficiently as possible. Barcode scanning enables consistency with other systems in the supply chain. Digital proof of delivery capture provides end-to-end tracking and client login means deliveries can be booked and tracked and reports accessed directly.									
Major Market Failures	General	Route planning and optimisation is currently executed in isolation by individual fleet operators. There is a risk that if multiple fleet operators optimise their routing strategies in response to the same stimuli (e.g. diverting freight traffic onto a lower capacity road to avoid congestion), this could create new problems elsewhere. To counter this, more data sharing between major hauliers should be encouraged. Simulations have shown that if we were all willing to take a wider variety of coordinated routes that may not be optimised on an individual level, it would yield an overall reduction in congestion.									
Opportunities	Vehicle emissions savings due to route optimisation, reducing the amount of stem mileage and empty running. Better co-ordination of assets resulting in reduced waiting times and delivery windows										
Barriers	No co-ordination between operators, only done in isolation										
Local Relevancy	Larger fleet operators can again pave the way for the uptake in telematics and in cab technologies as they are more likely to have access to capital for upgrades and associated driver training requirements. The use and application of telematics can be a short-term win for helping the road sector, particularly HGVs, decarbonise in the event of a slower transition to alternative fuels. Congestion on the network and routing concerns in and around Dublin, as well as a lack of network resilience provided by on ground infrastructure, makes telematics investment a cost effective way to improve driver efficiency (and save costs), improve road safety and reduce the externalities from road freight movements (all led by industry).										
Impact on Freight Objectives											
Economy			Environment				Society				
Freight efficiency		Max	Air quality		Max	Safety		Min			
Improved journey times, optimised use of fleets, delay mitigation and improved supply chain connectivity to save time and costs			Reduce the impact of the sector through air quality improvements and a reduction in other forms of pollution and intrusive activities			Improve the safety of the sector to reduce the number of accidents involving goods vehicles					
Industry contribution		Min	Greenhouse gas emissions		Max	Community disturbance		Max			
Improved jobs and opportunities to address skills shortages, support for inward investment, land availability, infrastructure provision			Reduction in greenhouse gas emissions from the sector to achieve net-zero by 2050			Reduce the impact of freight on communities, noise levels, air quality and informal overnight lorry parking					
Connectivity		Med	Urban realm		Med	Placemaking		Max			
Improved connectivity seamless intermodal activity to support local, national and international freight movements across the area			Minimising the intrusive impact of freight transport on visual amenity and local, protected settings			Better integrate freight into land use planning, development, construction and servicing plans, better freight data					

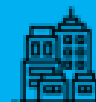
DYNAMIC KERBSIDE MANAGEMENT		Mode Relevance	 	Freight Sector	Last Mile Logistics & B2B Couriers	4Rs	Re-time, Re-route	Technical Maturity	Piloting	Commercial Maturity:	Not operating commercially
Definition: [Trend]	Dynamic kerbspace management allows spaces to be booked through a connected digital system. This enables the creation of virtual loading bays and for the use of kerbspace to be changed throughout the day to better suit local demand. It also enables dynamic pricing structures to manage demand for parking across urban areas and to ensure that the roadside is clear ahead of essential works or events.							Category	Data and Connectivity		
								Geographical Applicability:			
Best Practice	Use Cases										
	Grid Smarter Cities Kerb [Dublin, Westminster]	Grid Smarter Cities have been working with Dublin City Council to better understand and analyse potential use-cases for Kerb, their Intelligent Kerbside Management solution in the city centre—with the ambition to dynamically manage the kerbside with the use of Virtual Loading Bays (VLBs). Kerb is an app that gives commercial vehicles the ability to book a Virtual Loading Bay (VLB) on previously restricted kerb space in the city or to extend loading periods in time restricted locations. This added flexibility helps to ensure that more deliveries are made during in the least disruptive places and periods.									
	Ford GoPark [London, Islington]	GoPark has been developed in collaboration with city and local government partners to manage their kerbspace more effectively. Previous and current work includes digitally mapping city on-street parking, a parking guidance app for drivers, and using live vehicle data to identify empty parking spaces nearby. the app (still in beta testing) distils all of Islington's convoluted parking rules down to three pieces of information: Can you park here? If so, for how long? And how much will it cost?									
	Arup FlexKerbs [Simulation]	To understand if, and to what extent, FlexKerbs could support CAV deployment while maintaining streets' active and placemaking functions, this project simulated FlexKerb functionality on Cheapside—the historic high street in the City of London. An illustrative 24-hour schedule was devised of FlexKerb space allocation, informed by demand data but driven by local policy, which was then tested using microsimulation modelling. This assessment demonstrated that FlexKerbs would serve as a highly effective tool for improving both the operational efficiency and the public realm of a CAV-enabled street especially.									
Major Market Failures		[Currently in piloting and proof of concept stage]									
Opportunities	Better management of kerb space, dynamic uses throughout the day to enable space to be used more efficiently, fewer PCN issues to operators, enables other uses such as 'play streets' or 'school streets' during the day. Also offer more clarity to operators and consumers to have the certainty that loading bays will be available and that space can be used as needed, potentially closer to the destination. Targeting PCN hotspots.										
Barriers	Digitisation of kerbside could be costly, enforcement for non-digital users without using physical measures, possible policy and TRO implications. Needs to involve lots of silo organisations, shifted revenue streams										
Local Relevancy	Dublin already has experience of deploying kerbside management practices so could look to reflect on the feedback from trials to scale up its application to dovetail proposed changes to streets within the city centre (through pedestrianisation). There is an opportunity to take a proactive approach towards developments across the Quays and Docklands to introduce smart systems as l way to mitigate the impact of future delivery movements on the local environment and ultimately the final design of new sites (i.e. not building plentiful delivery and servicing spaces but making best use of selected areas). A single platform that can be rolled out to local service centres and smaller urban centres across the GDA would be recommended whilst trials in Dublin City Centre covering smart first and last mile deliveries also noted the need to upgrade parking legislation so to support the uptake of new technologies.										
Impact on Freight Objectives											
Economy			Environment				Society				
Freight efficiency Improved journey times, optimised use of fleets, delay mitigation and improved supply chain connectivity to save time and costs		Max	Air quality Reduce the impact of the sector through air quality improvements and a reduction in other forms of pollution and intrusive activities		Min	Safety Improve the safety of the sector to reduce the number of accidents involving goods vehicles		Med			
Industry contribution Improved jobs and opportunities to address skills shortages, support for inward investment, land availability, infrastructure provision		Med	Greenhouse gas emissions Reduction in greenhouse gas emissions from the sector to achieve net-zero by 2050		Min	Community disturbance Reduce the impact of freight on communities, noise levels, air quality and informal overnight lorry parking		Max			
Connectivity Improved connectivity seamless intermodal activity to support local, national and international freight movements across the area		Max	Urban realm Minimising the intrusive impact of freight transport on visual amenity and local, protected settings		Max	Placemaking Better integrate freight into land use planning, development, construction and servicing plans, better freight data		Max			


AUTONOMOUS VEHICLES		Mode Relevance		Freight Sector	Haulage & Cordoned Sites	4Rs	Re-mode	Technical Maturity	Piloting	Commercial Maturity:	Commercial testing / piloting
Definition: [Trend]	Much of the cost of delivery is the costs of drivers' salaries, and often deliveries are slowed due to mandatory rest periods whilst driving. Furthermore, 95% of accidents are attributed to human error, so with increasing automation it is hoped that road safety will improve for all users. CAVs are considered by many to be key to the future of parcel delivery, due in part to the cost savings that can be achieved by removing the need to pay a driver's salary. There are many pilots underway to test different sizes and types of CAVs which vary from small units that travel to residential areas for last mile delivery, to long distance applications using platoons of HGVs on trunk roads.							Category	Automation		
								Geographical Applicability:			
Best Practice	Use Cases										
	ARRIVAL ROBOPILOT [Bristol, UK]	In the ROBOPILOT project, a small all-electric van will be fully automated for local deliveries and tested safely in the north Bristol Innovation Corridor. Also involving work on safety and security (including cyber security), the objective is to deliver parcels on a fully autonomous 10-mile journey in all kinds of weather, and on various types of roads. The project seeks to understand what real-world use cases could adopt highly automated commercial vehicles, helping to overcome existing problems, issues or challenges in the transport system.									
	Nuro Nuro R2 [USA]	Nuro have designed a vehicle specifically to move goods between and among businesses, neighbourhoods, and homes. The fully autonomous vehicle is unmanned and about half the width of a passenger car. It's built with ultra-light materials and designed for neighbourhoods. These combined design elements will make it one of the safest vehicles on the road. Furthermore, this vehicle is the first company to receive a driverless exemption from the federal government in the USA.									
	Oxbotica CargoPod [Greenwich UK]	The trial service is part of the GATEway (Greenwich Automated Transport Environment) program and will operate in the Woolwich area of Greenwich. Once customers place an order at Ocado, the CargoPod collects it and sets out on a number of set routes around the neighbourhood. Each order has its own GPS coordinates, and once the van has reached its programmed destination, customers can collect their order from one of the eight compartments. The van can hold up to 128kg (282 pounds) of groceries at a time.									
Major Market Failures	Uber [USA]	Uber decided in 2020 to sell off its driverless car division to technology start-up Aurora. The move came as part of a drive to push for profitability. The company has maintained a 26% stake in the self-driving subsidiary and continues to maintain an interest, but the programme hit seer setbacks when one of Uber's driverless vehicles hit a woman in Tempe, Arizona in 2018. Although a supervisory driver should have been attentive to intervene, the supervisor was watching a streaming service at the time of the incident.									
Opportunities	Big savings on the cost of delivery thanks to the removal of a human driver, Vehicle could operate continuously without the need for driver breaks. Likely safety benefits due to automated systems not getting tired or distracted etc. Autonomy also allows vehicle platooning to reduce fuel costs.										
Barriers	Trialling is possible as long as the vehicle adheres to the 1988 Road Traffic Act – still requires human oversight. New regulations allow 'hands off, eyes on up to 60kmph, perhaps enabling urban applications but this is not full self-driving and still requires a human in the loop.										
Local Relevancy	Although autonomous vehicles have not be trailed commercially within the GDA, there is potential scope to explore its use for selected scenarios; namely operating a small vehicle within a portside environment for movements of goods and equipment within a cordoned environment. However, the best-case example would seek to use radial road infrastructure and the prominence of longer distance inter regional trip generation as the test bed for autonomous vehicles between the GDA and other parts of Ireland (for example Cork to Dublin along the N7/M7). Autonomous vehicles can help make up for the shortfall in haulage drivers, particularly for longer distance driving.										
Impact on Freight Objectives											
Economy			Environment				Society				
Freight efficiency		Max	Air quality		Med	Safety		Max			
Improved journey times, optimised use of fleets, delay mitigation and improved supply chain connectivity to save time and costs			Reduce the impact of the sector through air quality improvements and a reduction in other forms of pollution and intrusive activities			Improve the safety of the sector to reduce the number of accidents involving goods vehicles					
Industry contribution		Max	Greenhouse gas emissions		Med	Community disturbance		Min			
Improved jobs and opportunities to address skills shortages, support for inward investment, land availability, infrastructure provision			Reduction in greenhouse gas emissions from the sector to achieve net-zero by 2050			Reduce the impact of freight on communities, noise levels, air quality and informal overnight lorry parking					
Connectivity		Med	Urban realm		Max	Placemaking		Min			
Improved connectivity seamless intermodal activity to support local, national and international freight movements across the area			Minimising the intrusive impact of freight transport on visual amenity and local, protected settings			Better integrate freight into land use planning, development, construction and servicing plans, better freight data					


PLATOONING		Mode Relevance:			Freight Sector	Haulage	4Rs	Re-mode	Technical Maturity	Piloting	Commercial Maturity:	Commercial testing / piloting
Definition: [Trend]	In truck platooning highly advanced V2V and sensor technology will allow two or more wirelessly connected trucks to drive at a short distance apart. Using the driving information from the first truck in the platoon, the following vehicles can automatically accelerate, brake and steer. While platooning, when the lead vehicle brakes, the following vehicles automatically brake with no noticeable reaction time significantly increasing road safety. This enables the gap between truck combinations to be reduced as much as possible, which due to slipstreaming can save 10% in fuel and an equivalent reduction in CO2 emissions.								Category		Automation	
									Geographical Applicability:			
Best Practice	Use Cases											
	TRL DAF Vehicle Platooning [UK]	TRL successfully delivered a feasibility study for a UK road trial of autonomous platooning heavy vehicles. Their report predicts significant and practical benefits to road safety, capacity, congestion, CO2 efficiency and fuel economy and defines the aspects that require further information. Their independent assessment provided the Department of Transport with a clear picture of how an autonomous platooning trial could operate for heavy vehicles, along with producing a number of technology roadmaps.										
	TNO ENSEMBLE [Europe]	The ENSEMBLE Project aimed to demonstrate technical trials of platooning technology including ensuring interoperability between different manufacturers, safety and designed-in failsafes that manage the interactions between vehicles in the platoon and other road users. Practical tests on closed testing grounds and in real life serve to an experience of 'learning by doing', to assess the impact on traffic and infrastructure and to promote multi-brand platooning. Furthermore, the project will design an interface to cloud-based services so that the platooning concept can be seamlessly integrated into the logistic value chain.										
	Pelaton PlatoonPro [California, USA]	The Peloton System has proven savings of more than 7% when platooning using industry standard tests: 4.5% for the lead truck, and 10% for the following truck. Platooning only occurs when it's safe, where it's safe, and how it's safe. Peloton's cloud-based Network Operations Cloud (NOC) approves each platoon. It adjusts platooning parameters to be safe for conditions. Each driver is empowered with over-the-horizon alerts at all times. The NOC maximizes platooning opportunities by notifying drivers of potential pairings based on their location and anticipated route. The NOC can find platooning partners for drivers on route or platooning can be planned ahead of time.										
Major Market Failures	Mercedes-Benz	Mercedes-Benz Trucks has concluded that there is no business case for truck platooning, saying that the technology failed to deliver appreciable fuel savings in its on-the-road tests. Although the manufacturer will remain committed to ongoing platooning projects with partners, such as Ensemble in Europe, it now plans to refocus its resources on developing autonomous, self-driving technologies in its trucks.										
Opportunities	Ties in with increasing levels of vehicle automation and is particularly suited to inter regional and national movements of freight along key corridors											
Barriers	Congestion and relatively frequent motorway junctions in the UK may be a barrier to implementation. Regulatory barriers - need to understand the liabilities of the lead and following vehicles when platooning. Successful application would require a critical mass of platoon-capable vehicles on the SRN to provide the opportunities to link with other vehicles.											
Local Relevancy	Highly relevant for interregional trips radiating from the GDA to major conurbations across the rest of the Island of Ireland and may be well suited to complement proposals to improve strategic corridors (i.e. Belfast to Dublin (MI)). Platooning, as with automation more generally, can help overcome some of the challenges of recruiting and retaining HGV drivers in Ireland whilst the opportunity for a driver to rest mid route can also offset the demand for a quick investment in lorry parks. Platooning would also dovetail any plans for a priority freight network and the use of its (VMS). As a sector, platooning could aid hauliers with saving costs from enhanced fuel efficiency. There may even be scope for operators to share responsibility and to develop platoons.											
Impact on Freight Objectives												
Economy			Environment					Society				
Freight efficiency Improved journey times, optimised use of fleets, delay mitigation and improved supply chain connectivity to save time and costs		Max	Air quality Reduce the impact of the sector through air quality improvements and a reduction in other forms of pollution and intrusive activities			Max	Safety Improve the safety of the sector to reduce the number of accidents involving goods vehicles			Min		
Industry contribution Improved jobs and opportunities to address skills shortages, support for inward investment, land availability, infrastructure provision		Med	Greenhouse gas emissions Reduction in greenhouse gas emissions from the sector to achieve net-zero by 2050			Max	Community disturbance Reduce the impact of freight on communities, noise levels, air quality and informal overnight lorry parking			Min		
Connectivity Improved connectivity seamless intermodal activity to support local, national and international freight movements across the area		Med	Urban realm Minimising the intrusive impact of freight transport on visual amenity and local, protected settings			Min	Placemaking Better integrate freight into land use planning, development, construction and servicing plans, better freight data			Min		


LOAD SHARING		Mode Relevance	  	Freight Sector	Haulage & Freight Forwarding	4Rs	Re-duce	Technical Maturity	Mature Technical Operation	Commercial Maturity:	Operating Commercially
Definition: [Trajectory]		Load sharing connects parcels to journeys by making use of available space in existing journeys to deliver parcels which otherwise would have been shipped through traditional more expensive means. Load sharing means that businesses can move freight sooner, rather than having to wait until they have accumulated enough product to fill an entire deck. Very often, there is always someone nearby about to undertake a journey, who is prepared to take a parcel to its destination by incorporating a parcel delivery in their routine or occasional trip.						Category		Aggregation	
								Geographical Applicability:		   	
Best Practice		Use Cases									
		Innovate UK FreightShareLab [UK]	FreightShareLab is aiming to reduce empty running and improve partly loaded vehicle percentages. They are developing an open data software platform to coordinate the sharing of assets. In a similar way to what it appears Clear Chain, discussed above, is looking to achieve, they aim that the software will act as a strategic planning tool, integrating job and vehicle data from shippers, fleets and carriers								
		Penske Logistics Clear Chain [USA]	In the United States, Penske Logistics have developed software called Clear Chain that aims to match up empty-running trucks with jobs they could undertake. Real-time visibility of trucks, driver hours and work allow backhaul loading opportunities to constantly be updated and matches to be facilitated when appropriate. Finding the right backhaul opportunity requires intense coordination, because the timing must match at every step of the delivery process. Carriers need to find backhauls that fit within their schedule and also products that work within their trailers.								
		LoadShare [UK]	LoadShare is a unique service connecting parcels to journeys or people to deliveries. If you have a parcel to deliver there is always someone, about to undertake a journey, who is prepared to take that parcel to its destination by incorporating your parcel delivery in their routine or occasional trip. Likewise, if you have a journey to undertake, there is always a parcel close to your route that, for some small deviations of journey, you can take with on route and supplement your journey costs.								
Major Market Failures		Road Tech [UK]	Road Tech is a market leader for providing IT services for the haulage and logistics sectors in the UK. The company trialled a marketplace hub for matching requirements for haulage work with spare capacity with the Road Haulage Association for several years. In the end they concluded it did not work as what was always left were either jobs that no one wanted or ones that were priced at too low a rate. It was also argued that many activities in logistics actually rely on a relationship of trust between the logistics provider and their customer and often include a certain degree of uniqueness so that a commoditised sharing notion, although on the surface an attractive option, in reality is difficult to actually achieve								
Opportunities		Making use of spare capacity on other modes such as rail, bus, DDRT or car.									
Barriers		Most effective in geographies where transport is over longer distances than is common in the UK. Also concerns by operators around data sharing and the value for money for taking up shipment opportunities									
Local Relevancy		This is a mechanism/platform that can be quickly and easily mobilised across the GDA and relies more on the awareness and promotion by industry and public authorities to scale up interest. Empty running is a particular issue within both an urban context (LGVs) and for hauliers having unloaded at ports across the GDA. Load sharing does offer SMEs working within the GDA on tighter margins and less established/regulated customer bases to develop additional workstreams; an approach that could be pursued with the support of trade/industry bodies.									
Impact on Freight Objectives											
Economy			Environment				Society				
Freight efficiency Improved journey times, optimised use of fleets, delay mitigation and improved supply chain connectivity to save time and costs		Max	Air quality Reduce the impact of the sector through air quality improvements and a reduction in other forms of pollution and intrusive activities			Max	Safety Improve the safety of the sector to reduce the number of accidents involving goods vehicles			Min	
Industry contribution Improved jobs and opportunities to address skills shortages, support for inward investment, land availability, infrastructure provision		Min	Greenhouse gas emissions Reduction in greenhouse gas emissions from the sector to achieve net-zero by 2050			Max	Community disturbance Reduce the impact of freight on communities, noise levels, air quality and informal overnight lorry parking			Min	
Connectivity Improved connectivity seamless intermodal activity to support local, national and international freight movements across the area		Med	Urban realm Minimising the intrusive impact of freight transport on visual amenity and local, protected settings			Min	Placemaking Better integrate freight into land use planning, development, construction and servicing plans, better freight data			Min	


WASTE MANAGEMENT PARTNERSHIP		Investment Needed	LOW	Sector	Waste Management	Actors	Public/Private	Risk Level	Low	4Rs	Re-duce
Definition: [Trajectory]	Business Improvement Districts, Chamber of Commerce and other business led groups developing a contract framework with a waste management provider on behalf of levy payers or members to offer a reliable, efficient service that would increase recycling, reduce costs and reduce vehicle movement around the city centre to ease congestion and improve air quality. The basic premise is to consolidate waste collections into fewer vehicles and seek to informally regulate the industry.							Category	Eco Logistics		
								Geographical Applicability:			
Best Practice	Use Cases										
	Suez & Bath BID Trade Waste Partnership [Bath]	The Bath BID has been working in partnership with SUEZ (formerly SITA) for the past seven years to provide a streamlined and excellent citywide trade waste and recycling service for the BID area. The purpose of streamlining the city's trade waste collection and recycling service is to reduce congestion and city pollution by reducing the number of waste collection operators in the city each day and improve the appearance of the public realm in our World Heritage Site. Rates are 25% less for levy payers, with on site support from Suez to foster better recycling practices and reduce the weight of commercial waste. Companies save over 20% on costs of collections and Suez optimises vehicle loads during collections.									
	Bristol Waste & Broadmead BID Zero Emission Collections	Broadmead BID's partnership with Bristol Waste enables all levy-payers to take advantage of discounted, and very competitive, prices. Bristol Waste is proud not to be just a waste collection company, but also a part of the Bristol community, bringing together businesses across Bristol by reducing and re-using waste. There is plenty of B2B movement too as Bristol Waste would like to encourage businesses to recycle crisp packets to reduce general waste stream, with packets a being donated to Bristol Zoo Gardens, who send them to Walkers, who then sends back a small rebate (circular economy)									
	Better Bankside BID Subsidised Recycling Service	All Better Bankside businesses are eligible to sign up for subsidised recycling service with Paper Round offering an allocation of sacks (and 15% discount on food waste sacks) and a subsidised range of other collection requirements (dry recycling). Paper Round will work with the business to arrange collections times and dates that work for the business. They can also come into the business and carry out a waste audit to identify areas were recycling rates can be improved and additional savings made and work with other partners to collect and recycle more unusual consignments									
Opportunities	Fostering better recycling activity and reducing business overheads through behaviour change techniques. Reduces HGV movements and allows for routing optimisation to save provider costs/secure demand										
Barriers	Challenge of operating within an unregulated market where other commercial providers are still present. Needs buy in at volume to work effectively.										
Local Relevancy	An opportunity for Dublin Town, a consortium of businesses and local stakeholders to proactively coordinate future waste management activity to reduce businesses overheads, minimise vehicle trips (and shadowing) and support alternative modes for transport for the collection and serving of properties within Dublin City Centre. This could act as a pilot proof of concept to roll out to other service centres and urban areas. This initiative would help bring together a focus on wider recycling and environmentally friendly practices and catalyse a discussion on the role and impact of deliveries (B2C), the scope for reverse logistics (C2B) and options that businesses could pursue for moving goods and items between levy payers/members (Peer 2 Peer)										
Impact on Freight Objectives											
Economy			Environment				Society				
Freight efficiency Improved journey times, optimised use of fleets, delay mitigation and improved supply chain connectivity to save time and costs		Max	Air quality Reduce the impact of the sector through air quality improvements and a reduction in other forms of pollution and intrusive activities		Med	Safety Improve the safety of the sector to reduce the number of accidents involving goods vehicles		Med			
Industry contribution Improved jobs and opportunities to address skills shortages, support for inward investment, land availability, infrastructure provision		Max	Greenhouse gas emissions Reduction in greenhouse gas emissions from the sector to achieve net-zero by 2050		Med	Community disturbance Reduce the impact of freight on communities, noise levels, air quality and informal overnight lorry parking		Max			
Connectivity Improved connectivity seamless intermodal activity to support local, national and international freight movements across the area		Min	Urban realm Minimising the intrusive impact of freight transport on visual amenity and local, protected settings		Max	Placemaking Better integrate freight into land use planning, development, construction and servicing plans, better freight data		Max			


EMISSION ZONES		Investment Needed	Medium	Sector	Road Transport	Actors	Public	Risk Level	High	4Rs	Re-mode, Re-duce, Re-mode
Definition: [Trend]	A Clean Air Zone is an area where targeted action is taken to improve air quality, in particular by discouraging the most polluting vehicles from entering the zone. No vehicle is banned in the zone, but those which do not have clean enough engines will have to pay a daily charge if they travel within the area. There are different types of emission zones of measures to offset the impact of vehicle traffic on air quality that can be implemented by local authorities (often under the jurisdiction of national government departments).							Category		Regulatory	
								Geographical Applicability:			
Best Practice	Use Cases										
	Ultra-Low Emission Zone (ULEZ) London	The Ultra-Low Emission Zone (ULEZ) operates 24 hours a day, 7 days a week, every day of the year (except Christmas Day). It covered the same area as the Congestion Charge zone until 25 October 2021 when it expands to cover a broader area. Despite recent improvements in air quality, toxic air pollution in remains the biggest environmental risk to the health of all Londoners and reducing the amount of pollution from traffic remains one of the best ways of improving air quality. The vehicle standards for entering these CAZs will be Euro VI for diesel and Euro IV for petrol, any non-compliant vehicles will be charged upon entry to the zone, but not banned									
	Air Quality Speed Limit Trials UK	Trialling 60mph speed limits on short sections of the Strategic Road Network where action needs to be taken to reduce emissions and improve air quality. This is a trail but should result in a reduction in NO ₂ when traffic speed is reduced from 70 to 60mph at six locations. The locations (noted above) were identified as locations where NO ₂ levels exceed the legal limit annual mean limit level of 40 µg/m ³ .									
	Green Travel Districts Birmingham	Pre-requisite to the Clean Air Zone, The Green Travel Districts sought to focus investment on public transport, walking and cycling to try to encourage people to use cars less, with the city's road infrastructure stretched. The vision is for districts with less congestion, less pollution and fewer accidents to contribute towards Birmingham's carbon and air quality targets. GTDs build on the experiences of Birmingham's Smarter Choices programme by integrating travel awareness on a local level within a wider policy and infrastructure framework and where there were higher concentrations of commercial activity.									
Opportunities	The core objectives of reducing air pollution through regulation and legislation to reduce the number of high emitting vehicles on urban roads and nudge changes in freight practices										
Barriers	Needs government and political backing. Will be less effective if undertaken voluntarily or if the approach does not suggest charging models are applied. Will have disproportionate impact on HGVs										
Local Relevancy	One of the main causes that Dublin would see contributing to its overall pollution levels would be fumes and emissions coming from vehicles, with large amounts of personal automobiles such as cars and motorbikes inhabiting the roads, causing the levels of PM2.5 and other pollutants to skyrocket during certain periods of the day, particularly during rush hour or in any area that sees a high volume of traffic. There is also the issue of HGVs giving off their own pollutants, with many of them running on diesel which can release further pollutants related to the combustion of fossil fuels. An emission zone, targeted at reducing GHG emissions and nudging behaviour change through re-modelling and reducing journeys through the city centre, could complement or replace the HGV cordon; with the opportunity to deploy greater enforcement measures (through ANPR technology) to manage access accordingly.										
Impact on Freight Objectives											
Economy			Environment				Society				
Freight efficiency Improved journey times, optimised use of fleets, delay mitigation and improved supply chain connectivity to save time and costs		Med	Air quality Reduce the impact of the sector through air quality improvements and a reduction in other forms of pollution and intrusive activities		Max	Safety Improve the safety of the sector to reduce the number of accidents involving goods vehicles		Med			
Industry contribution Improved jobs and opportunities to address skills shortages, support for inward investment, land availability, infrastructure provision		Med	Greenhouse gas emissions Reduction in greenhouse gas emissions from the sector to achieve net-zero by 2050		Max	Community disturbance Reduce the impact of freight on communities, noise levels, air quality and informal overnight lorry parking		Max			
Connectivity Improved connectivity seamless intermodal activity to support local, national and international freight movements across the area		Med	Urban realm Minimising the intrusive impact of freight transport on visual amenity and local, protected settings		Min	Placemaking Better integrate freight into land use planning, development, construction and servicing plans, better freight data		Max			


HGV Management /Routing		Investment Needed	Low	Sector	Road (Haulage & Freight Forwarding)	Actors	Public	Risk Level	Medium	4Rs	Re-route, Re-time
Definition: [Trend]	Working with partners to reduce HGV movements on inappropriate routes by working with departments, businesses and fleet operators (drivers included) when travelling through, to and from, and within the GDA. There are notorious challenges with enforcing certain restrictions and raising visibility of them in, around and between key trip generators to minimise externalities, particularly air pollution and road safety issues in urban areas. Dublin has had a HGV Management Strategy in place since 2007 with a cordon being employed across the city centre to limit access for HGVs within the time window through the application of a permit scheme.							Category	Regulatory		
								Geographical Applicability:			
Best Practice	Use Cases										
	Truck Route System Vancouver	Vancouver implemented a truck route system which sought to sift the movement of truck with 3 or more axles and a gross vehicle weight greater than 4.5 tonne along designated routes, which skirted the city centre and passed key trip generators. These were operation on a 24-hour basis with vehicles only able to deviate to make local deliveries. In the city centre, no vehicle with a length greater than 15.25m was permitted between 7am and 6pm, seven days a week with deliveries arriving outside of peaks or in alternative vehicles.									
	Lorry Maps (& Signage) Worcestershire	Lorry Route Map was developed to mitigate the impact of road freight movements that outlined advisory routes for HGVs, identify barriers to lorry movements and highlight suitable facilities for lorry drivers. Major trip attractors, peak time congestion, inclines, width and heigh restrictions, laybys etc were also incorporated to aid with routing behaviour. 8 sites were also developed on the strategic road network where signage was deployed to assist with the distribution of information whilst HGV directional signage was also installed.									
	Freight Gateway Oxford County Council [UK]	The Gateway system is a computerised system, which enables Local Authorities to disseminate their freight strategies including freight restrictions into a national mapping portal. The significant advantage of using the Gateway system is dynamic routing function which can be updated to reflect planned incidents on the highway network such as road closures or temporary highway restrictions. To further support this system a driver app is being developed which aims to rival the driver's use of satellite navigation system whist the system also ties into a 'Lorry Watch' portal and the councils VMS system,									
	Lorry Route (& Watch) Pro Mapping	A software platform that can aid both public authorities, drivers and fleet managers with HGV routing and to digitise a range of restrictions, regulations and road information to support navigation and compliance respectively. The software also enables residents and communities to contribute information and violations into the system that are then uploaded to the public authorities for enforcing retrospectively.									
Opportunities	Offers an opportunity to collate data (software options) whilst improving legibility of access restrictions and suitable routing options. Popular initiative that can be supported by industry.										
Barriers	Enforcement will remain an issue until powers to ensure and legislate the use of ANPR technology can subsequently be used to issue Penalty Charge Notices for noncompliance of restrictions										
Local; Relevancy	Highly relevant to the GDA and the City of Dublin with a longstanding HGV Management Strategy already in place since 2007. Live discussions taking place about extending the cordon and restricting access to a greater number of vehicles (four axles as well as five axles) need to account for the current challenges around enforcement and visibility of the restrictions on road and in pre-planning. Further research is required to assess whether abuse of the system is due to a deliberate lack of compliance or poor wayfinding and signage; the latter potentially being addressed through digitising information and feeding area restrictions and routing requirements into sat-nav software systems.										
Impact on Freight Objectives											
Economy			Environment				Society				
Freight efficiency Improved journey times, optimised use of fleets, delay mitigation and improved supply chain connectivity to save time and costs		Max	Air quality Reduce the impact of the sector through air quality improvements and a reduction in other forms of pollution and intrusive activities		Max	Safety Improve the safety of the sector to reduce the number of accidents involving goods vehicles		Max			
Industry contribution Improved jobs and opportunities to address skills shortages, support for inward investment, land availability, infrastructure provision		Min	Greenhouse gas emissions Reduction in greenhouse gas emissions from the sector to achieve net-zero by 2050		Max	Community disturbance Reduce the impact of freight on communities, noise levels, air quality and informal overnight lorry parking		Max			
Connectivity Improved connectivity seamless intermodal activity to support local, national and international freight movements across the area		Max	Urban realm Minimising the intrusive impact of freight transport on visual amenity and local, protected settings		Max	Placemaking Better integrate freight into land use planning, development, construction and servicing plans, better freight data		Max			


QUIET DELIVERIES		Investment Needed	Low	Freight Sector	Road Freight	Actors	Public Sector, Businesses, Industry Bodies	Risk Level	Low	4Rs	Re-time, Re-route
Definition: [Trend]	Re-timing deliveries allow goods to be delivered to businesses outside normal hours, using techniques to minimise noise and disturbance and the externalities generated from freight movements. The aim of shifting deliveries to other times is to improve delivery schedules and reduce congestion and the impact of carbon emissions in peak hours (within or outside the shoulders of the day). There can be many techniques involved to reduce visual and noise intrusion; ranging from the type of vehicle used to the equipment sourced to move goods over the last 250m for minimising community disturbance.							Category		Eco Logistics	
								Geographical Applicability:			
Best Practice	Use Cases										
	Silent Night time Deliveries CIVITAS [Barcelona]	The development of night deliveries was made in collaboration with two supermarket operators, Mercadona and Condis. In Valencia Street. The operator Mercadona demonstrated that night-time deliveries could be made using adapted trucks and quiet unloading methods. The pilot (which was subsequently rolled out across the rest of the city) demonstrated benefits in terms of reduced delivery times and lower transport operating costs whilst greater efficiency was achieved by replacing seven daytime deliveries with two deliveries by larger, quieter vehicles outside peak hours.									
	Retiming Deliveries Consortium Transport for London	The consortium was established on the back of the 2012 Olympic Games and in collaboration with the Freight Transport Association, Road Haulage Association, Noise Abatement Society, major national retailers and several local authorities, to advocate, promote and educate business and government around the benefits of retiming within London. The Co-op was one of the organisations who engaged with the consortium to help re-time deliveries across 100 of their London based stores. A subsequent guide of Quiet Deliveries was also produced for the capital to aid with re-timing deliveries based on industry best practice.									
	Project ZEUS European Institute of Innovation and Technology	The ZEUS project aims to show that urban goods can be delivered in off-peak hours in a quiet, efficient, and environmentally friendly way. Using off-peak hours of 7pm-7am means delivery trucks will not contribute to rush hour and traffic jams. To keep these late-night deliveries quiet the project is looking at quiet transport trailers, low-noise pallet trucks, and covered loading docks at the stores. Colruyt Group is using their stores in city centres as real test sites and hoping that the ZEUS project not only helps their own delivery system but can be used as a blueprint for cities across Europe.									
Opportunities	Reduces the externalities from delivery and collection activities on local communities whilst recognising the need for freight movements to take place and optimised for the industry to support society										
Barriers	The application may vary depending on the organisation and influence over supply chain decisions (especially if vehicles are trip chaining between multiple sites during a day)										
Local Relevancy	As with many urban areas and city centres/service centres, a key aim is to encourage deliveries serving Dublin City Centre and using the primary route network to re-time outside of peak periods (which will vary from place to place). Traffic mixing between freight and other forms of road transport, creates congestion and concentrates air pollution; with quiet deliveries aiming to identify and recalibrate freight activity outside of busy windows to minimise delay (and ultimately supply chain efficiency). Large supermarket chains and wholesalers, both with larger fulfilment centres in peri urban locations, should be the target audience for re-timing and even re-routing deliveries to improve journey times. Quiet deliveries can be factored into DSP and CLP guidance too for minimising noise pollution during different times of the day.										
Impact on Freight Objectives											
Economy			Environment				Society				
Freight efficiency Improved journey times, optimised use of fleets, delay mitigation and improved supply chain connectivity to save time and costs		Max	Air quality Reduce the impact of the sector through air quality improvements and a reduction in other forms of pollution and intrusive activities		Max	Safety Improve the safety of the sector to reduce the number of accidents involving goods vehicles		Max			
Industry contribution Improved jobs and opportunities to address skills shortages, support for inward investment, land availability, infrastructure provision		Min	Greenhouse gas emissions Reduction in greenhouse gas emissions from the sector to achieve net-zero by 2050		Med	Community disturbance Reduce the impact of freight on communities, noise levels, air quality and informal overnight lorry parking		Max			
Connectivity Improved connectivity seamless intermodal activity to support local, national and international freight movements across the area		Min	Urban realm Minimising the intrusive impact of freight transport on visual amenity and local, protected settings		Max	Placemaking Better integrate freight into land use planning, development, construction and servicing plans, better freight data		Max			



DELIVERY & SERVICING PLANS		Investment Needed	Low	Sector	Planning Policy	Actors	Public	Risk Level	Low	4Rs	Re-duce, Re-mode, Re-route
Definition: [Trend]	A Delivery and Servicing Plan (DSP) sets out how building occupiers will enable safe, clean and efficient deliveries to their site. These are typically a planning condition that is discharged on the basis that organisations and developers are making attempts to reduce the externalities from delivery and collection activity across a site. DSPs can apply to existing sites where there may also be opportunities to save costs, make efficient use of space and contribute towards CSR.							Category		Land Use Planning	
								Geographical Applicability:			
Best Practice	Use Cases										
	Delivery & Service Plans Guidance Transport for London	Transport for London (TfL) have developed a detailed set of DSP guidance from to help showcase and illustrate the stages that local authorities and developers (omnrganisations) go through to ensure freight movements are considered at the forefront of developing new residential or commercial dwellings; with the aims of ultimately discharging a planning condition for a site. The guidance is designed to support the planning process and mitigate the externalities from freight movements on new and existing communities.									
	Pathfinder Towns Trailblazer Project UK Towns	The TRAILBLAZER project (Transport and Innovation Logistics by Local Authorities with a Zest for Efficiency and Realisation) has achieved a reduction in energy used in urban freight transport through public sector policy interventions across Europe by showcasing good practices and promoting DSPs. The key objectives of the project was to implement the actions container in the DSPs produced by PATHFINDER cities/towns (Liverpool, Sutton, Croydon and Lambeth); evidence reduced energy use as a result of DSPs; transfer knowledge to less experienced organisations and promote best practice in freight energy efficiency amongst local and regional authorities and the private sector in Europe..									
	Delivery & Servicing Plan Toolkit Birmingham City Council	Birmingham City Council created a toolkit to support the development and implementation of Delivery and Servicing Plans (DSPs) by businesses and organisations operating in Birmingham to support the roll out of Green Travel Districts (GTD) and business engagement across service centres located on arterial routes through the city. This was based on a desire to encourage behaviour change through an assessment of delivery and servicing activities as part of a one to one survey, interviews and observational analysis of sites.									
Opportunities	Embedding best practice into key decision-making processes and supporting integrated land use and transport planning. Mitigates externalities from developments and optimises freight journeys										
Barriers	Needs to be properly enforced and monitored to assess compliance. A 'stick' needs to be applied to have an impact such as the need for a plan to be developed to discharge a planning condition										
Local Relevancy	A missing component of assessing and setting planning conditions for new development sites that can be factored into the process for the four local authorities. The development of a clear toolkit for developers would be highly valuable and ensure consistency in the development of plans that can be requested at pre-application phase for sites of a particular size or with notable frequent requirements. A toolkit should also have equal applicability to pre-existing developments so that it can be used to target freight generators and rolled out across service centres where delivery and servicing issues are prevalent and need addressing to reduce congestion, improve air quality and improve business/supply chain efficiency. This would be applicable along the R network in places such as Rathmines, Portobello and The Liberties.										
Impact on Freight Objectives											
Economy			Environment				Society				
Freight efficiency Improved journey times, optimised use of fleets, delay mitigation and improved supply chain connectivity to save time and costs		Max	Air quality Reduce the impact of the sector through air quality improvements and a reduction in other forms of pollution and intrusive activities		Max	Safety Improve the safety of the sector to reduce the number of accidents involving goods vehicles		Max			
Industry contribution Improved jobs and opportunities to address skills shortages, support for inward investment, land availability, infrastructure provision		Max	Greenhouse gas emissions Reduction in greenhouse gas emissions from the sector to achieve net-zero by 2050		Max	Community disturbance Reduce the impact of freight on communities, noise levels, air quality and informal overnight lorry parking		Max			
Connectivity Improved connectivity seamless intermodal activity to support local, national and international freight movements across the area		Med	Urban realm Minimising the intrusive impact of freight transport on visual amenity and local, protected settings		Max	Placemaking Better integrate freight into land use planning, development, construction and servicing plans, better freight data		Max			

CONSTRUCTION LOGISTICS PLANS		Investment Needed	Low	Sector	Planning Policy	Actors	Public	Risk Level	Low	4Rs	Re-duce, Re-route, Re-time
Definition: [Trend]	A CLP provides the framework for understanding and managing construction vehicle activity into and out of a proposed development. They are developed early in the planning process and focus specifically on construction supply chains and how to reduce impact on the road network. The construction supply chain covers all movements of goods, waste and servicing activity to and from site. The plans are developed by developers, but the guidance is produced by local authorities and enforced by them internally. There are outline and detailed CLPs with affiliated non-compulsory codes of practice, namely the Considerate Constructor Scheme, also worth consideration down the supply chain							Category		Land Use Planning	
								Geographical Applicability:			
Best Practice	Use Cases										
	H2020 Programme for SUCCESS CIVITAS EU	The European Sustainable Urban Consolidation Centres for construction (SUCCESS) project aimed to improve the efficiency and reduce negative impacts of the construction supply chain by exploring and testing reliable and innovative solutions. Different solutions were tested in four pilot sites in the partner countries, Valencia, Paris, Verona and Luxembourg City which including using guidance material and tools to assess data and use appropriate solutions (e.g. e-collaboration tools, GIS) to reduce cost and transit time of construction materials, the number of journeys and/or the number of kilometres per vehicle (GHG emissions) and improve the reliability and the flexibility regarding delivery of supplies to construction sites.									
	Construction & Logistics Plans (CLP) Transport for London	Transport for London alongside CLOCS have produced a best practice guidance document for developers and local authorities to help mitigate the externalities from developments. This guidance document assists those looking to write either an effective outline CLP or a detailed CLP as well as explaining in further detail the difference between the two. Templates and tools have also been designed that can be completed by developers to save time and costs with developing the plans and helping to steer the content required.									
	Construction Logistics Plan Framework Croydon Council	Fostering a collaborative model between the council, contractor and supply chain in order to maximise efficiencies and provide greater project certainty. The implementation of a macro level 'Framework CLP' considers collectively the construction activity taking place across Croydon Town Centre to generate more substantial benefits than could be achieved by considering individual sites in isolation. This would make it easier to integrate logistics processes across development sites; for example, among others, removing direct conflicts between deliveries to neighbouring sites and allowing consolidation of deliveries leading to a reduction in the number of deliveries.									
Opportunities	Embedding best practice into key decision-making processes and mitigating externalities from new developments. Supply chain efficiencies and collaboration save time and reduce costs.										
Barriers	Needs to be properly enforced and monitored to ensure developer and supply chain compliance. Success is built on sound cooperation between different stakeholders to be meaningful.										
Local Relevancy	Similarly, to DSPs, CLPs are a missing component of the local development planning architecture to help mitigate the externalities from construction activity. Each local palling authority should seek to embed the requirement for a CLP into the conditions set for planning permission. These can be outline or full CLPs with clear guidance/toolkit being developed to complement the roll out of the condition. CLPs are relevant in all contexts; whether it is a new site within a burgeoning logistics site which will inevitably look towards using the M50 for access, to city centre locations which are spatially constrained and where HGV access should be limited to improve (the perception of) road safety.										
Impact on Freight Objectives											
Economy			Environment				Society				
Freight efficiency		Max	Air quality		Max	Safety		Max			
Improved journey times, optimised use of fleets, delay mitigation and improved supply chain connectivity to save time and costs			Reduce the impact of the sector through air quality improvements and a reduction in other forms of pollution and intrusive activities			Improve the safety of the sector to reduce the number of accidents involving goods vehicles					
Industry contribution		Max	Greenhouse gas emissions		Max	Community disturbance		Max			
Improved jobs and opportunities to address skills shortages, support for inward investment, land availability, infrastructure provision			Reduction in greenhouse gas emissions from the sector to achieve net-zero by 2050			Reduce the impact of freight on communities, noise levels, air quality and informal overnight lorry parking					
Connectivity		Med	Urban realm		Max	Placemaking		Max			
Improved connectivity seamless intermodal activity to support local, national and international freight movements across the area			Minimising the intrusive impact of freight transport on visual amenity and local, protected settings			Better integrate freight into land use planning, development, construction and servicing plans, better freight data					


BUILDING CODE REGULATIONS		Investment Needed	LOW	Sector	Planning Policy	Actors	Public	Risk Level	Low	4Rs	Re-route, Re-duce
Definition: [Trend]	This measure involves the use of building code regulations to ensure that new business premises provide adequate space for goods handling and storage. By ensuring that they have suitable off-street delivery areas or storage zones, the number of on-street loading/unloading activities causing congestion and obstruction due to the high number of delivery trucks and the related heavy burden on public streets can be reduced. Markets, bars, and restaurants are the most relevant targets for this measure as they generate very frequent deliveries							Category		Land Use Planning	
								Geographical Applicability:			
Best Practice	Use Cases										
	Servicing Adaptations Mercat de la Concepció [Barcelona]	The remodelling of the Mercat de la Concepció in 1998 was the start of the initiative to provide off-street cargo handling space in public markets regulations to build off-street delivery areas or storage areas within newly built business establishments and stores, with the objective of reducing the number of on-street operations. The ordinance states that all new buildings of at least 400 m2 have to arrange at least one delivery zone within their premises. New bars and restaurants have to build a storage area with a minimum size of 5 m2 or <u>5% of</u> their total floor area.									
	BREEM Certification BREEM	BREEAM is an assessment undertaken by independent licensed assessors using scientifically based sustainability metrics and indices which cover a range of environmental issues. Its categories evaluate energy and water use, health and wellbeing, pollution, transport, materials, waste, ecology and management processes. This means BREEAM rated developments are more sustainable environments that enhance the well-being of the people who live and work in them, help protect natural resources and make for more attractive property investments									
	Locking Dock Safely Logistics UK	Shopping centres and large stores in central business districts have limited space and often have insufficient or out-dated loading docks. Logistics UK have developed a guide for delivering safe, efficient, and sustainable logistics. Loading docks present a number of significant risks that require careful management. Differing specifications for docks and vehicles, visiting drivers, and the lack of direct communication between drivers and warehouse staff all contribute to potential problems.									
Opportunities	To reduce enforcement requirements, road user conflict and congestion alongside user safety during delivery, collection and servicing activity; Would set best practice.										
Barriers	Would require cross department collaboration within local authorities to deliver working with developers. Sites may also be physically constrained or need retrofitting and unable to accommodate servicing yards.										
Local Relevancy	This scheme would start the process of normalising freight considerations into the design and planning process of new developments; especially given the forecast growth in mixed use developments across the GDA and particularly the intensification of housing and commercial activity across Dublin. There is limited consistency in the application of building codes to this effect so embedding best practice principles or a sense check tool into the process can help to raise standards.										
Impact on Freight Objectives											
Economy				Environment				Society			
Freight efficiency Improved journey times, optimised use of fleets, delay mitigation and improved supply chain connectivity to save time and costs			Med	Air quality Reduce the impact of the sector through air quality improvements and a reduction in other forms of pollution and intrusive activities			Min	Safety Improve the safety of the sector to reduce the number of accidents involving goods vehicles			Max
Industry contribution Improved jobs and opportunities to address skills shortages, support for inward investment, land availability, infrastructure provision			Min	Greenhouse gas emissions Reduction in greenhouse gas emissions from the sector to achieve net-zero by 2050			Min	Community disturbance Reduce the impact of freight on communities, noise levels, air quality and informal overnight lorry parking			Max
Connectivity Improved connectivity seamless intermodal activity to support local, national and international freight movements across the area			Min	Urban realm Minimising the intrusive impact of freight transport on visual amenity and local, protected settings			Max	Placemaking Better integrate freight into land use planning, development, construction and servicing plans, better freight data			Max


URBAN CONSOLIDATION		Mode Relevance		All	Freight Sector	Last Mile Logistics	4Rs	Re-mode, Re-route	Technical Maturity	Initial real-world operation	Commercial Maturity:	Commercial Launch
Definition: [Trajectory]	Freight consolidation exploits the economies of aggregation by combining multiple shipments destined for a geographic region into a single load where upon arrival, the shipment is broken into smaller consignments for onward delivery across the locality. Consolidation can happen at all scales, manifesting differently at various points in the logistical chain. Remote consolidation, as implied, takes place on the periphery of an urban area usually aggregating deliveries in larger warehousing units; with LGVs delivering consignments across a broad area. Micro consolidation is associated with zero carbon delivery over the last mile and is more interwoven within a city centre context.								Category		Consolidation	
									Geographical Applicability:			
Best Practice		Use Cases										
	Zedify Zero emission hub [Bristol]	Zedify received a £100,000 grant to set up a zero emission delivery hub in Bristol to enable their fleet of electric cargo bikes to make sustainable last mile deliveries across the city centre. It is hoped that within 10 years, 95% of deliveries can be made by electric vehicles. The zero-emission hub is located on the edge of Bristol where it interceptions deliveries bound for the city centre. Here, freight is processed and then remoded on to electric cargo bike, or other sustainable last mile mode of delivery, to make the part of its journey to the recipient of the delivery. This mode prevents vans an HGVs from having to access the congested centre of Bristol, and therefore creates savings in CO2 emissions and improves air quality in the locality. Zedify Bristol's new depot is part of a national urban network, with nine other microconsolidation hubs across the country.										
	Travelwest Bristol Bath Freight Consolidation Centre	Bristol Freight Consolidation Centre was initially set up as a pilot scheme in 2004 with European funding to help alleviate issues associated with freight in Broadmead, Bristol. At its peak, a 70% to 80% reduction in the number of onward trips was seen by the freight consolidation scheme subsidised by Bristol City Council to serve the central area between 2004 and 2018. This meant that for every 10 vehicles that made a delivery to the consolidation centre, just 2 or 3 onward journeys to the central area were made. The return trip provided the opportunity to return packaging materials for recycling. This has only recently become commercially viable; with management now shifted to DHL to operate and run										
	CoMoUK Mobility Hubs Guidance	"Local Mobility Hubs" will provide an array of mobility, commercial and community services to a surrounding area and will allow people to lead low-car lifestyles by co-locating the movement of people with the services that they might commonly need on their daily journeys. One such service that could be provided is a micro-consolidation hub where freight can arrive for distribution across a local area. Furthermore, the coincidence of the movement of goods and people also offer an opportunity for travellers to access 'click-and-collect' services and make use of parcel lockers.										
Major Market Failures	Elcidis UCC Urban consolidation Centre [La Rochelle]	La Rochelle Urban Community has been implementing a last mile urban freight delivery service using electric vans and trucks for more than 15 years, based on receiving conventional heavy goods vehicles (HGVs) and transferring goods to electric vehicles to make the last mile delivery. The assessment on the freight movements captured by the Elcidis UCC revealed that the service is not fully delivering the expected environmental and financial gains (capturing 100 freight movements per day out of 670 (15%) in the city centre generated by freight carriers - or 4% of 2,288 movements per day overall). As such, the business model is proving to be unprofitable, and unsustainable. Reasons for failure included: Location – not being located on strategic routes in La Rochelle, Regulatory framework - does not incentivise the use of the UCC, or indeed electric vehicles. Complementary functions - No additional services beyond the distribution of goods are offered (e.g. recycling processing facility for reverse flows)										
Opportunities	Links with mobility hubs and transport interchanges for interface with space capacity on public transport, consolidation as a means of re-modng for the last mile of delivery											
Barriers	Extra cost incurred as a result of additional handling of goods whilst any approach should look to be industry led and embedded to ensure synergies with business supply chains											
Local Relevancy	The GDAs urban grain and transport networks are particularly conducive to consolidation. The canal and river network, radial and orbital road network as well as defined urban centres, allow for consolidation at key intermodal interchange points in both remote and hyper urban locations. This could include the M50, where fulfilment and distribution centres are already established by industry leaders, as well within the vicinity of the cordon applied for managing HGV traffic in Dublin City Centre. Ideally the rings of consolidation would also be linked. A number of pilot initiatives, involving six established third partly logistics providers, were trailed in 2018 within Dublin City Centre which offered a valuable insight to test proof of concept. Business engagement and buy in were crucial to this particular workstream.											
Impact on Freight Objectives												
Economy				Environment				Society				
Freight efficiency		Max	Air quality		Med	Safety		Med				
Improved journey times, optimised use of fleets, delay mitigation and improved supply chain connectivity to save time and costs			Reduce the impact of the sector through air quality improvements and a reduction in other forms of pollution and intrusive activities			Improve the safety of the sector to reduce the number of accidents involving goods vehicles						
Industry contribution			Greenhouse gas emissions			Community disturbance						
Improved jobs and opportunities to address skills shortages, support for inward investment, land availability, infrastructure provision		Max	Reduction in greenhouse gas emissions from the sector to achieve net-zero by 2050		Med	Reduce the impact of freight on communities, noise levels, air quality and informal overnight lorry parking			Max			
Connectivity		Max	Urban realm		Max	Placemaking		Max				
Improved connectivity seamless intermodal activity to support local, national and international freight movements across the area			Minimising the intrusive impact of freight transport on visual amenity and local, protected settings			Better integrate freight into land use planning, development, construction and servicing plans, better freight data						

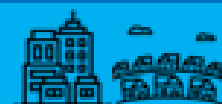
SUSTAINABLE PROCUREMENT		Investment Needed	LOW	Sector	Procurement	Actors	Public/Private	Risk Level	Low	4Rs	Re-mode, Re-duce
Definition: [Trend]	Starting with in house policy changes for procuring goods and services to ensure these are 'green' and can reduce freight miles; with conditions applied to contract terms and conditions for sustainable delivery and opportunities for re-moding. Changes to procurement can leverage a wider benefit pool, including supporting SMEs, conditioning living wages and ultimately helping to improve the social, environmental and economic outlook of the town and wider region. Joint procurement should also be explored between public institutions for essential non-perishable goods.							Category		Demand Management	
								Geographical Applicability:			
Best Practice		Use Cases									
	Preston Model Community Wealth Building [Preston, Lancashire]	The "Preston Model" is a term applied to how the council, its anchor institutions and other partners are implementing the principles of Community Wealth Building within Preston and the wider Lancashire area. The city council is committed to implementing this approach and, as the "place leader" for the city is promoting the concept to other anchor institutions in and around Preston and to the private sector. Community wealth building offers an opportunity for local people to take back control, to ensure that the benefits of local growth are invested in their local areas, are used to support investment in productive economic activities and that people and their local institutions can work together on an agenda of shared benefit.									
	Joint Procurement Ryedale, Selby and Scarborough Councils [North Yorkshire]	Joint procurement means combining the procurement actions of two or more contracting authorities. The key defining characteristic is that there should be only one tender published on behalf of all participating authorities with aggregation taking place in the supply chain during delivery. The Councils of Ryedale, Selby and Scarborough jointly spend £53 million every year on the supplies, services and works needed to deliver services to public of all areas. How well these goods are procured to those requirements has a critical impact on performance and ability to provide value for money									
	Sustainable Procurement Framework Clean Cargo UK	In order to reduce their transport-related impacts and achieve global climate objectives, member companies of the Clean Cargo Working Group have co-developed a framework that will enable companies to effectively benchmark themselves against their peers and to evaluate their progress in supplier management, within the context of sustainability practices in logistics. Shippers advance their supplier management programs by identifying key activities and best practices that they can implement to improve their own sustainability performance and foster sustainability improvements among their suppliers.									
Opportunities		Reducing freight miles and maximising vehicle payloads by securing constant demand. Opportunities to re-mode freight vehicles by sourcing locally and embedding this in contractual agreements									
Barriers		Potential to conflict with competition authority is seen to favour local companies; but can be avoided by breaking up large contract orders into smaller requests under a procurement threshold.									
Local Relevancy		A key discussion that could be facilitated between anchor instructions across the GDA, starting first with the four local authorities to look at benchmarking procurement practice, exploring shared procurement opportunities and collating together local spend and contract conditions to understand the extent to which procurement is sustainable and reducing freight trips/miles/demand. This discussion can expand to larger private sector companies such as Accenture and Johnsons Controls etc to assess the impact that freight requirements have on supporting the local economy and also the ramifications have on transport efficiency, safety and sustainability.									
Impact on Freight Objectives											
Economy				Environment				Society			
Freight efficiency Improved journey times, optimised use of fleets, delay mitigation and improved supply chain connectivity to save time and costs			Max	Air quality Reduce the impact of the sector through air quality improvements and a reduction in other forms of pollution and intrusive activities			Max	Safety Improve the safety of the sector to reduce the number of accidents involving goods vehicles			Min
Industry contribution Improved jobs and opportunities to address skills shortages, support for inward investment, land availability, infrastructure provision			Max	Greenhouse gas emissions Reduction in greenhouse gas emissions from the sector to achieve net-zero by 2050			Max	Community disturbance Reduce the impact of freight on communities, noise levels, air quality and informal overnight lorry parking			Min
Connectivity Improved connectivity seamless intermodal activity to support local, national and international freight movements across the area			Med	Urban realm Minimising the intrusive impact of freight transport on visual amenity and local, protected settings			Min	Placemaking Better integrate freight into land use planning, development, construction and servicing plans, better freight data			Min

GREENER FLEETS		Investment Needed	Low-High	Freight Sector	Road Freight	Actors	Businesses, Industry Bodies, Public Sector	Risk Level	Medium	Scheme Maturity:	Deployed
Definition: [Trend]	Undertaking periodic vehicle fleet review and maintain a clean fleet with corporate procurement policy being developed to continue with improving fleet efficiency. Led by industry and public institutions to help catalyse shift towards cleaner vehicles and earmarking upgrades for complementary charging infrastructure in future investment priorities and strategies respectively. Industry is increasingly exploring a shift in fleet management practices and vehicle procurement to keep up with the shift towards a zero-carbon future.							Category	Procurement		
								Geographical Applicability:			
Best Practice	Use Cases										
	Cleaner Fleet Policy Derby City Council [UK]	An attempt by a local authority to replace their fleet of 48 vehicles (cars & LGVS) with electric battery alternatives, which will remove 98 tonnes of CO2 tailpipe emissions from the air each year. The policy introduces a 'Low Emission Hierarchy of Vehicle Procurement'; providing the flexibility to take advantage of future shifts in the operational, financial and environmental changes across low emission vehicle technologies. The intention is to lead the way locally as a major employer and key anchor institution to encourage others across the private sector to adopt the same practices to meet the aims of local and national policy and address the climate emergency.									
	Green Fleet Review Commercial Group [UK]	Commercial Group, the UK's largest independent office services company, transformed their delivery scheduling after committing to a 'greening' of their vehicle fleets and managed to reduce fleet carbon emissions by 50 per cent during 2007. This was partly attributed to a commitment to a company wide carbon emissions reduction after an extensive review of its fleet vehicles with almost 90 per cent of the organisation's CO2 emissions came from its owned fleet vehicles. A 300,000-mile replacement policy was also introduced across the LGV fleet alongside a commitment to upgrading vehicles to a more fuel efficient, compliant Euro 6 engines.									
	EV Fleet Transition Lime [US]	Lime have pledged to transition its entire fleets to electric by 2030. This is well over 100,000 owned and leased trucks, vans and vehicles used for moving around scooters and associated equipment as part of its commitment to the Climate Group V100. It is working with Ceres to advocate policies internally that will support the transition. Lime are the first micromobility provider engaged in the programme and view its fleet transition in the context of improving infrastructure capacity and delivering its local fleet management strategy. It initial started its fleet transition in 2018 by neutralized all emissions associated with their fleet of operations vehicles with verified carbon offset projects.									
Opportunities	Opportunity for organisations to fulfil their CSRs and respond to the need to transition from diesel and petrol vehicles (linked to national policy) towards electric and alternative fuels on a comprehensive scale.										
Barriers	May appeal to larger organisations with significant fleet management responsibilities but more difficult for SMEs to achieve, especially sole traders.										
Local Relevancy	Hugely significant in the context of local authorities across Ireland; with less than 2 per cent of local authority vehicles being electric or hybrid and no common policy being in place to green vehicle fleets. However, with a larger proportion of the GDA covering urban areas, the public sector should look to lead by example; starting first with LGVs and then exploring the development of hydrogen or CNG powered fleet policies depending on a parallel policy being put in place for alternative fuel infrastructure. Dublin City Council, as the biggest public authority within the GDA, should seek to take the lead and work with NTA  develop a coherent approach towards fuel infrastructure and green fleet policies.										
Impact on Freight Objectives											
Economy			Environment					Society			
Freight efficiency		Max	Air quality		Max	Safety		Improve the safety of the sector to reduce the number of accidents involving goods vehicles			Min
Improved journey times, optimised use of fleets, delay mitigation and improved supply chain connectivity to save time and costs			Reduce the impact of the sector through air quality improvements and a reduction in other forms of pollution and intrusive activities								
Industry contribution		Med	Greenhouse gas emissions		Max	Community disturbance		Reduce the impact of freight on communities, noise levels, air quality and informal overnight lorry parking			Min
Improved jobs and opportunities to address skills shortages, support for inward investment, land availability, infrastructure provision		Reduction in greenhouse gas emissions from the sector to achieve net-zero by 2050									
Connectivity		Min	Urban realm		Min	Placemaking		Better integrate freight into land use planning, development, construction and servicing plans, better freight data			Min
Improved connectivity seamless intermodal activity to support local, national and international freight movements across the area		Minimising the intrusive impact of freight transport on visual amenity and local, protected settings									

SHARED ASSETS		Investment Needed	Low	Freight Sector	Road, Rail, Air, Sea	Actors	Businesses, Industry Bodies, Public Sector	Risk Level	High	Scheme Maturity:	Deployed
Definition: [Trend]	Larger companies working together or a host of smaller organisations seeking to achieve online delivery logistics synergies in an industry led approach to cost savings and efficiencies. Can work to support economies of scale or provide low cost access into consolidation/fulfilment to mitigate investment risk in a facility and to share the running of the site and many aspects of the delivery operations. Affordable warehousing space is becoming a premium due to the rise in e-commerce and the costs and availability of land in strategic locations so more flexible or shared options are becoming more attractive.							Category		Groupage	
								Geographical Applicability:			
Best Practice	Use Cases										
	Shared Fulfilment Ocado & Morrisons [South East London]	Ocado entered into an agreement to supply Morrisons' online grocery delivery service and provided space Shared Fulfilment Centres (SFC) alongside access to Morrisons with the software necessary to fulfil online orders from its stores with the aim of offering online services in areas not currently serviced by a customer fulfilment centre. Morrisons has also recently agreed terms with Amazon based on a similar offer to expand area coverage – including last mile deliveries. The approach is viewed as low risk and a capital light wholesale supply arrangement.									
	Flexible Warehouse Peel Ports [Liverpool]	The availability of decentralised, strategic network of warehouses located closer to the market available for sharing (one-to-one and multi-customer space sharing). A multi-user facility provides flexibility in space allocation with rental space covering pallets or other standardised module designs. The digital sharing platform allows utilisation of the vacant warehousing space where mixing diverse sectors with different seasonality peaks supports flexibility. Peel Ports home to the £400m Liverpool2 terminal is an example of a new container shipping with advanced facilities, port-side storage and the flexibility to meet the demands of each and every customer, through flexible warehousing solutions.									
	Multi User Warehouse Imperial Logistics [Germany]	Opened in 2020 with easy access to Germany's A1 and A2 autobahns and proximity to courier and express companies with adjacent land available for potential future expansion. The multi user warehouse operates a pay-as-you-use billing model, reducing user costs and assisting budgeting and cash flow and is closely aligned to manufacturing operations within the wider industrial zone (Imperial is handling inventory control for outbound lines, as well as providing frequent trailer shuttles to and from manufacturing sites). The lean management methodology also drives efficiencies whilst the company is able to pass on savings through consolidated purchasing of packaging materials.									
Opportunities	Maximising the use of surplus warehousing capacity and optimising use of new facilities at strategic locations for freight movements to improve site, travel and cost efficiencies										
Barriers	High capital cost to invest or retrofit a facility (who pays). As a burgeoning concept, there may be a demand by companies to see supply chain transparency. Land also has to be available in key locations										
Local Relevancy	This practice looks towards building a future ready freight sector which acknowledges both the rising demand and pressure on warehousing space that will come to fruition across the GDA and the opportunity that shared assets bring for allowing smaller organisations to enter the market to further boost the role of freight and logistics as a key economic driver for the city region. There are a number of examples of shared fulfilment centres associated with wholesale storage and distribution (banded around the M50) with scope longer term to explore shared assets at a local scale within a city centre and service centre environment (where currently none exist). The latter would be complemented by zero carbon last mile logistics.										
Impact on Freight Objectives											
Economy			Environment				Society				
Freight efficiency		Max	Air quality		Med	Safety		Min			
Improved journey times, optimised use of fleets, delay mitigation and improved supply chain connectivity to save time and costs			Reduce the impact of the sector through air quality improvements and a reduction in other forms of pollution and intrusive activities			Improve the safety of the sector to reduce the number of accidents involving goods vehicles					
Industry contribution		Max	Greenhouse gas emissions		Med	Community disturbance		Min			
Improved jobs and opportunities to address skills shortages, support for inward investment, land availability, infrastructure provision			Reduction in greenhouse gas emissions from the sector to achieve net-zero by 2050			Reduce the impact of freight on communities, noise levels, air quality and informal overnight lorry parking					
Connectivity		Max	Urban realm		Min	Placemaking		Min			
Improved connectivity seamless intermodal activity to support local, national and international freight movements across the area			Minimising the intrusive impact of freight transport on visual amenity and local, protected settings			Better integrate freight into land use planning, development, construction and servicing plans, better freight data					

DRIVER TRAINING		Investment Needed	Low-Med	Freight Sector	Road Freight	Actors	Businesses, Industry Bodies	Risk Level	Low	4Rs	Re-duce
Definition: [Trend]	The provision of training and development opportunities will provide a cost-effective way of getting the best out of individuals. A training programme would be aimed at drivers of HGVs and vans and is designed to improve overall fuel consumption, whilst assisting fleet managers with improving vehicle utilisation, accident rates, vehicle downtime and maintenance costs. Often this can involve extensive research into the technical and behavioural aspects of driving and undertaking a fleet review.							Category		Raising Best Practice	
								Geographical Applicability:			
Best Practice		Use Cases									
	Driver Training Carlsberg [UK]	Carlsberg UK runs a fleet of 296 vehicles, covering over 8.5 million miles every year and delivering to around 13,000 accounts every week. They wished to reduce the fuel cost and emissions generated by their vehicles, all of which are 7.5 tonnes or above, mostly 26 tonne rigid trucks. On this basis, emphasis was place on driver engagement and empowerment with the use of telematics (monitors drivers' performance on a daily basis and gives live updates via a web portal) helping to provide feedback on driving efficiency alongside providing training (courses), debriefs and introducing incentives. Since 2011, Carlsberg have saved 502,549 litres of fuel, £568,687 and 1,346 tonnes of CO2 and has reduced their drivers insurance premiums.									
	Young Driver Academy British Gas [UK]	Launched in 2014 to reduce collision rates, improve fuel use and lower fleet maintenance costs; with 45% of the company's young drivers (under 25s) involved in a collision. The academy was created to also improve the reputation and image of the company as well as meeting its CSR objectives. The academy is mandatory for 12 months under an apprenticeship produced by Fleetmaster and is ran in a structured manner covering 9 units, including eco-driving training which is subsidised through the Energy Saving Trust. Overall, the academy has helped see a 14% reduction in fuel consumption/wear and tear, a 30% reduction in collision rates (despite fleet growth) and positive feedback from engaged drivers on the course.									
	Advanced Driver Training Drive DeVilbiss [UK]	The organisation experienced rapid expansion and formed a 'Green Team' to assess environmental performance; identifying advanced driving training as key part of employee inductions alongside a handbook to develop a sustainable driving culture and technology to monitor data/feedback. Overall, fleet speeding offences reduced by over 15,000 in 2014 alone whilst the average distance, percentage speeding and vehicle idling times dramatically fell by 44% in the same year. Fuel use also declined year on year from 3,960 litres per vehicle in 2012 to 3,145 litres per vehicle on average in 2015 through EcoDriving and enhance fleet maintenance alone.									
Opportunities		Considerable cost saving benefits to businesses within road freight alongside better driver recruitment and retention levels. A strong case for schemes to tie in to meeting businesses CSRs.									
Barriers		Can often be associated with larger fleet operators and organisations who have significant budgets- in contrast to smaller operators who may also lack the time to invest in training and fleet reviews									
Local Relevancy		With such as large proportion of the overall haulier industry dominated by smaller fleet operators with limited capital to invest in new technologies and alternative fuels,, driver training can provide a valuable means to save costs associated with fuel consumption and vehicle maintenance through a structured training programme. Like with many accreditation and recognition schemes, boosting uptake and promoting the virtues of the scheme (potentially supplemented by financial incentives) could mark a realistic step in the roadmap towards decarbonising the road freight sector. Whilst a local scheme covering the GDA would be advantageous, a national programme may be necessitated because of the <u>cross-boundary</u> movements of operators and their respective bases across Ireland.									
Impact on Freight Objectives											
Economy			Environment				Society				
Freight efficiency		Max	Air quality		Max	Safety		Max	Max		
Improved journey times, optimised use of fleets, delay mitigation and improved supply chain connectivity to save time and costs			Reduce the impact of the sector through air quality improvements and a reduction in other forms of pollution and intrusive activities			Improve the safety of the sector to reduce the number of accidents involving goods vehicles					
Industry contribution		Max	Greenhouse gas emissions		Max	Community disturbance		Max	Max		
Improved jobs and opportunities to address skills shortages, support for inward investment, land availability, infrastructure provision			Reduction in greenhouse gas emissions from the sector to achieve net-zero by 2050			Reduce the impact of freight on communities, noise levels, air quality and informal overnight lorry parking					
Connectivity		Min	Urban realm		Max	Placemaking		Min	Min		
Improved connectivity seamless intermodal activity to support local, national and international freight movements across the area			Minimising the intrusive impact of freight transport on visual amenity and local, protected settings			Better integrate freight into land use planning, development, construction and servicing plans, better freight data					

ACCREDITATION AND RECOGNITION SCHEMES		Investment Needed	Low	Freight Sector	All Road Freight	Actors	Industry Bodies, Public Sector, Businesses	Risk Level	Low	4Rs	Re-mode, Re-duce, Re-route, Re-time
Definition: [Trend]	Many businesses are recognising the value of being an accredited or recognised member of an industry body and scheme to help boost their credentials amongst potential clients and supply chain partners. Whilst improving supply chain visibility, refining efficiency, and minimising cost are key operational drivers, fleet operators, suppliers and operators recognise the virtues of setting high environmental, safety and vehicle performance on financial sustainability. Equally local authorities and industry bodies are able to raise standards and help generate valuable datasets to inform future decision making.							Category		Raising Best Practice	
								Geographical Applicability:			
Best Practice	Use Cases										
	Fleet Operator Recognition Scheme FORS	The Fleet Operator Recognition Scheme (FORS) is a voluntary accreditation scheme for fleet operators which aims to raise the level of quality within fleet operations, and to demonstrate which operators are achieving exemplary levels of best practice in safety, efficiency, and environmental protection. FORS helps reduce work related road risk (WRRR) and demonstrates to a commitment to exceeding the industry standard. Already well stablished across Ireland with accreditation delivered through C Track (Inseego) but promotion is key. There are three levels of accreditation that can be attained for hauliers, suppliers and carriers of goods.									
	EcoStars Fleet Recognition Scheme ECOSTARS	EcoStars has been adopted around many UK and European cities with several membership options available to new organisations, businesses and local authorities. The aim of the scheme is to help fleet operators improve efficiency, reduce fuel consumption & emissions and make cost savings. This type of scheme seeks to both accredit /recognise the impetus taken by industry to improve safety, environmental standards and provide further, practical assistance to members. Implementing the key measures recommended by ECO Stars, a typical commercial vehicle operator could expect to reduce fuel consumption at least 5% in the first year or up to £2,450 per vehicle in fuel costs. The scheme is managed by consultants, TTR.									
	Logistics Emissions Reduction Scheme Logistics UK	A voluntary industry initiative to record, report and reduce transport emissions to feed into a public database (open source) to help report the sector contribution towards national emission reduction targets. The scheme is accessible to a company with a minimum of one vehicle and is designed to raise standards across the industry and awareness of the challenges and opportunities faced to meet targets. Such a scheme helps build awareness and promotion of environmentally friendly practices across the industry; operators can demonstrate their green credentials which hold weight with buyers, government and industry bodies. The scheme is also pivotal for data collection and using this to inform future decision making.									
Opportunities	Can help raise industry standards to support businesses efficiency and meet wider social and environmental aims. The structure of accreditation & recognition schemes is already well established in some cases.										
Barriers	Extra energy will need to be expended to engage with smaller operators, who may be less inclined or able to raise standards due to financial and time constraints/commitments										
Local Relevancy	Freight standards and best practice can be scaled up with support from major trade bodies such as the Irish Road Haulage Association and the promotion and awareness of accreditation and recognition schemes aimed at both large and small fleet operators across haulage and freight forwarding sub sectors of road freight transport. The push towards the professionalisation of the sector will have positive impact on reducing the environmental (emissions through fuel efficiency) and social (road safety and accidents) impacts of the sector whilst bringing about positive benefits to individual organisations and businesses who can benefit from additional exposure to market, access to training and resources. The collection of data, in some schemes, will help contribute towards a better, more robust database for making informed freight decisions.										
Impact on Freight Objectives											
Economy			Environment				Society				
Freight efficiency Improved journey times, optimised use of fleets, delay mitigation and improved supply chain connectivity to save time and costs		Max	Air quality Reduce the impact of the sector through air quality improvements and a reduction in other forms of pollution and intrusive activities		Max	Safety Improve the safety of the sector to reduce the number of accidents involving goods vehicles		Max			
Industry contribution Improved jobs and opportunities to address skills shortages, support for inward investment, land availability, infrastructure provision		Med	Greenhouse gas emissions Reduction in greenhouse gas emissions from the sector to achieve net-zero by 2050		Max	Community disturbance Reduce the impact of freight on communities, noise levels, air quality and informal overnight lorry parking		Max			
Connectivity Improved connectivity seamless intermodal activity to support local, national and international freight movements across the area		Min	Urban realm Minimising the intrusive impact of freight transport on visual amenity and local, protected settings		Max	Placemaking Better integrate freight into land use planning, development, construction and servicing plans, better freight data		Min			

Streetscape & Building Design		Investment Needed	Low	Sector	Planning Policy / Design Guidance	Actors	Public/Private /Third Sector	Risk Level	Medium	4Rs	Re-route, Re-time, Re-mode
Definition: [Trend]	The design of streets in neighbourhoods, local service centres and city centres can ignore the need for delivery and servicing of business and residential buildings. This can stem from a limited understanding of how a street or area functions as a collective and may underappreciate the rise in vehicle traffic generated by the boom in e-commerce, the frequency of goods deliveries and the loading/unloading requirements. The design of buildings, ranging from servicing yards through to fulfilment centres , must also be futureproofed and responsive to change.							Category		Land Use Planning	
								Geographical Applicability:			
Best Practice		Use Cases									
	Global Street Design Guide (2022) Virtual	A virtual design guide primarily focused on creating good, human scale places and with a wider appreciation of the different uses of a street, including operational practices and the use of the kerbside. Emphasis, in this instance, is placed on kerb regulation, applying dynamic forms of pricing and thinking about broader district level approaches to parking. Design ‘controls’ are also referenced in relation to how streets perform different functions over the course of the day with guidance being given on undertaking counts. There is also specific sections on designing for freight and service operators, including freight management and safety.									
	Gloucestershire Manual for Streets (2020) Gloucestershire	Reference is made to construction logistics for developments and how this needs to be adequately reflected in a Transport Assessment (TA) including potential impact and mitigation. Local site conditions will dictate the range of matters. Adequate space for heavy goods, delivery and public service vehicles must be made within the site boundary, which should not conflict with the proposed parking arrangements. Reference is made to provision for servicing and deliveries for car free developments and how this must always be made within the site, unless there is a strong fallback position which would remove this requirement.									
	Adaptative Strategies London Mayor of London	The guidance follows an earlier review of London’s high streets as part of the Mayor’s Good Growth by Design programme and has the aim of promoting and supporting a framework for high streets to adapt and diversify. In other words, it sets the tone for retrofitting current streetscapes based on how they are used now and in the future. There is a particular focus on the use of data in relation to the kerbside and promoting the need for servicing arrangements for high streets and new residential areas. Reference is made to the role of the planning process too condition a development to sign up to a specific delivery or servicing scheme serving the whole area. This is all packaged in a readable document with case studies on how areas of London have approached the need to provide for delivery and servicing activity.									
	Logistics Buildings of Tomorrow JLL, Virtual	This guide, which includes useful case studies, places particular emphasis on how logistics property could be flexible and adaptive to a range of demographic and technological change as well as urbanisation and sustainability. It sets out numerous exemplars to follow and the Well Building concept alongside 10 key attributes that must start to be considered as part of new designs. This is all in a simple format and can be used as a basis for delivering new logistics land.									
Opportunities	To help embed a ‘think freight’ approach into the process of planning new developments and retrofitting neighbourhoods from both a developer perspective and also as part of development control checks.										
Barriers	There is a distinction between ‘guidance’ and ‘standards’, with the former being loosely defined and easily evaded and the latter being mandated.										
Local Relevancy	The Design Manual for Urban Roads & Streets (DEMURS) makes very limited reference to the role of freight, delivery and servicing as part of the guidance informing street design and placemaking. Consequently, there is limited onus on properly accounting for vehicles within the design of places, especially in the context of increased e-commerce and LGV movements within neighbourhoods and local service centres. Development control processes should give due consideration to how delivering and servicing is physically and operationally accountable by developers whilst any retrofit to streets through placemaking schemes should also pay attention to the needs (and expectations) of businesses and residents requiring front door access particularly.										
Impact on Freight Objectives											
Economy			Environment				Society				
Freight efficiency Improved journey times, optimised use of fleets, delay mitigation and improved supply chain connectivity to save time and costs		Max	Air quality Reduce the impact of the sector through air quality improvements and a reduction in other forms of pollution and intrusive activities		Max	Safety Improve the safety of the sector to reduce the number of accidents involving goods vehicles		Max			
Industry contribution Improved jobs and opportunities to address skills shortages, support for inward investment, land availability, infrastructure provision		Min	Greenhouse gas emissions Reduction in greenhouse gas emissions from the sector to achieve net-zero by 2050		Max	Community disturbance Reduce the impact of freight on communities, noise levels, air quality and informal overnight lorry parking		Max			
Connectivity Improved connectivity seamless intermodal activity to support local, national and international freight movements across the area		Min	Urban realm Minimising the intrusive impact of freight transport on visual amenity and local, protected settings		Max	Placemaking Better integrate freight into land use planning, development, construction and servicing plans, better freight data		Max			



WSP House
70 Chancery Lane
London
WC2A 1AF

wsp.com

DRAFT - Not for Circulation