A Market Commodity Digest: Express Freight

GBR Transition Team actions to grow rail freight

August 2023

Contents

1. Context

This Commodity Digest sits within the work undertaken on the Long-Term Strategy for Rail, the Growth Target and the GBRTT Market Development Plan. It is part of a wider review of rail freight market studies into a number of commodity areas as well as the Freight Estate Strategy. The purpose of the Commodity Digest is set out in the GBR Market Development Plan, which states:

> *Commodity Digests* – the documentation of understood market need across a range of commodity areas, the constraints to growth and resultant proposed Strategic Freight Unit (SFU) development actions.

Figure 1: Strategic context for Commodity Digest

Express freight is an emerging commodity area of rail freight, and the sector is less established than other market sectors. The industry knowledge about rail requirements for the sector is still in its infancy. Great British Railway Transition Team (GBRTT) is building relationships with Freight operators, Rolling Stock Leasing Companies (ROSCO) and potential end customers to gain insights into the barriers to entry and the opportunities which rail could provide to encourage modal shift to rail for express freight. We've started to define the market opportunities into different categories, and distinct areas of support which would benefit end users in their assessment of transferring parts of their supply chains to rail.

This initial Commodity Digest is focused predominately on the opportunities in the parcel and e-commerce market, however, there are likely to be future opportunities within other market sectors, such as supplying the urban convenience format supermarket sector.

2. Market Background

The courier, express and parcels (CEP) parcel market is competitive and price-conscious in its decision-making around delivery modes. Insights from major parcel couriers suggests that most companies require rail to compete on price compared with other modes from the outset, regardless of potential environmental benefits of using transport with a smaller carbon footprint. The potential volumes carried by freight multiple units and the speed of delivery should contribute to the commercial benefits of rail. There are some practical considerations in assessing express freight opportunities, such as the current locations for courier companies and the warehouse facilities proximity to suitable railheads.

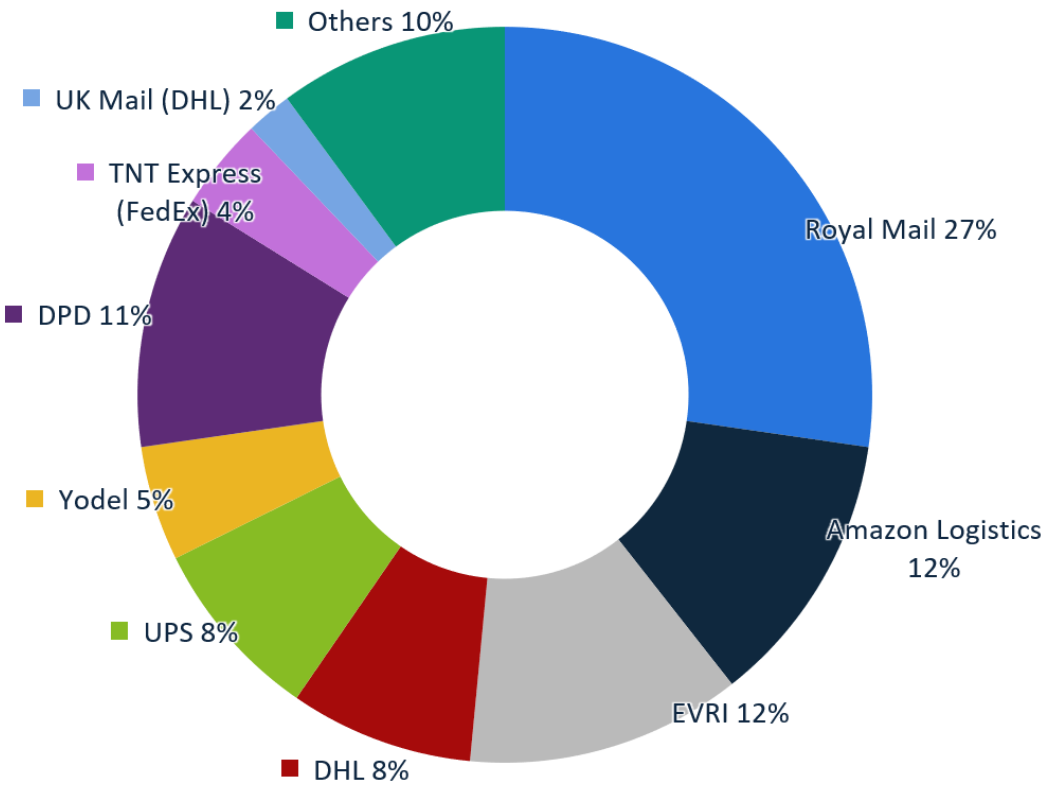


Figure 2: Estimated share - leading courier service providers (UK volume in 2021)

Typical Parcel Carrier Operating Model

Parcel handlers tend to operate a hub and spoke network of facilities, operating on a 24-hour cycle of sortation, distribution and delivery to customers. Each network will vary, but a typical company operating collection (B2B, C2C & B2C); sortation; and delivery to end customer could be represented by these steps:

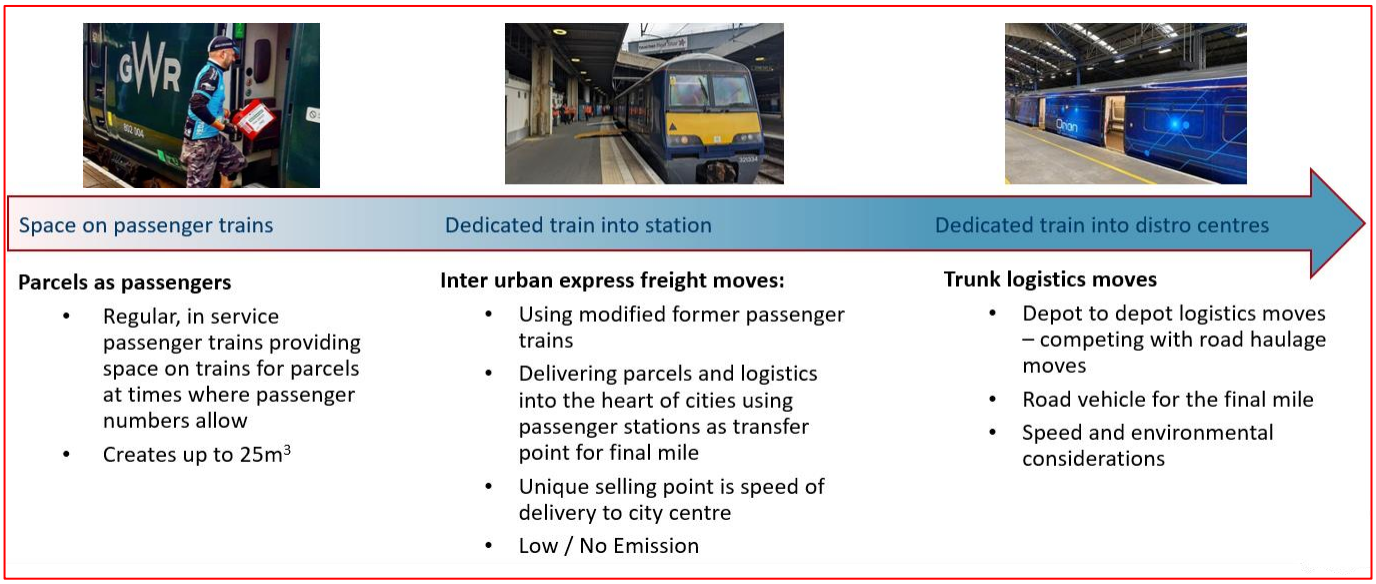
- Collection of parcels from Business or Customer
- Delivery to local warehouse location (40 small warehouses for medium sized operator)
- Transfer to major sortation hub (Regional or National Distribution Centre)

- Distribution back to local warehouse location (Local Delivery Centre
- Delivery to end customers

Understanding the volume of goods on each 'spoke' and the current challenges of delivery across the operator's network will be key in assessing the opportunities for modal shift to rail, as will the proximity to a suitable railhead for transferring goods from road to rail to limit any inefficiencies in changing modes.

Express Freight by Rail

When discussing express freight by rail, the concepts that are being referred to can be summarised by the following models:



3. Courier, Express and Parcel Market Trends

Data from Ofcom demonstrates the sharp increase in parcel deliveries over the last few years. The Covid-19 pandemic accelerated an existing trend in ecommerce and parcel deliveries in the B2C market. The number of packages rose by 32% between 2019/20 and 2020/21 (see *Figure 3*). Engagement with the sector suggests that this acceleration in the change in behaviours and habits is a permanent shift towards online and e-commerce. There has been a growth of 25% revenue between 2019/20 and 2020/21 (see *Figure 4)*, which shows the non-linear growth in revenue against volumes.

This shift in consumer habits has not yet led to a shift to rail for the increase in parcel traffic. It has, however, led to an interest in whether rail is compatible with existing supply chains for parcel companies.

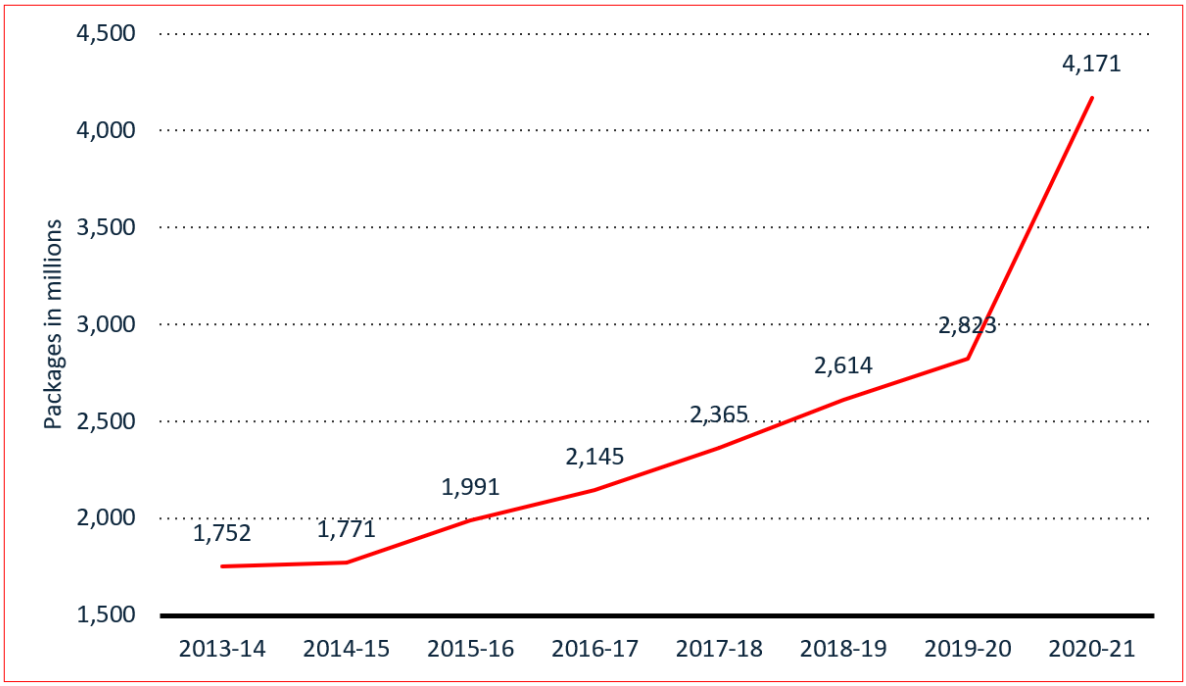


Figure 3: Volume of packages shipped in the United Kingdom (UK) from 2013 to 2021 (in millions)

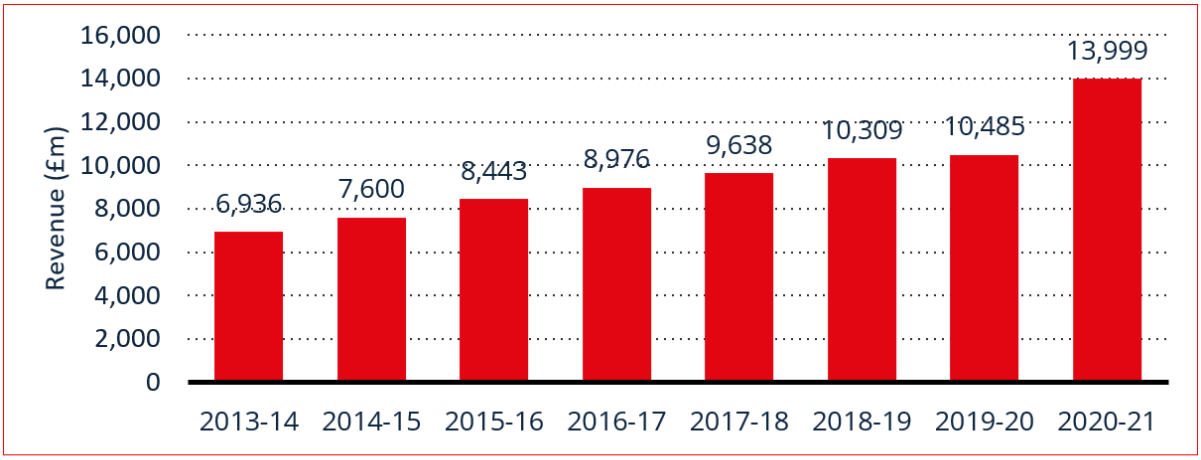


Figure 4: Annual revenue of parcel delivery in the United Kingdom (UK) from 2013 to 2021 (in million GBP)

The market expectation is that there is going to be steady continued growth in the parcel delivery market, albeit not with the sharp increase which was brought about by the Covid-19 Pandemic.

4. Addressable Market and Rail Opportunity

It is customer choice that drives market demand and freight modal choice is primarily driven by economic considerations. A party's use of rail must make economic sense, there is both on-rail offer competition between rail freight operators and inter-mode competition between rail and the primary alternative transport mode: road as well as air in the parcel / mail market.

[see the GBR Market Development Plan for the overarching GBR strategy for Railfreight Growth].

Today, rail freight holds a circa 9% share of surface market transport[1]. Express freight by rail is a much smaller market share than the overall surface market transport, and accounts for approx. 1% of the market represented by the companies in *Figure 2: Estimated share – leading courier service providers (UK Volume 2021).* Royal Mail is the main market player with a rail presence. Therefore, the express freight market is one which GBRTT should consider an opportunity for growth and assess what the opportunities are for modal shift of express freight.

Assessing the size of the rail-addressable part of the parcel market is a significant challenge, with limited information available to base any modelling assumptions on. In a fiercely competitive market, carriers are protective of the data they collate on volumes moved across their respective networks.

There is a wide range of possible market opportunities for introducing new flows of Express Freight Multiple Unit (FMUs) up to 12 carriage units onto the network using the current estimated HGV volumes. A conservative estimate would be to double the current volumes, which would equate to 15 four car units.

There appears to be a parcel-volume level which tips the economic scales in favour of moving parcels by train. In working to assess some of the operations, it appears that linehaul flows with less than 8 car FMUs are less likely to be cost competitive by rail. This means that those carriers with fewer than approx. 10 single-deck HGVs operating between locations will find it less compelling to shift volumes by rail unless they can be aggregated at origins and destinations with other carriers.

There is a segment of the market which is interested in a move to rail, on the basis that the HGV market is difficult and expensive to decarbonise, however, their operating model makes this difficult whilst using FMUs. Where a carrier relies on loose loading goods straight into HGV trailers, it means that, without a dedicated railhead at the Distribution Centre, the inefficiency in loading and unloading the FMU becomes too great to make the operation viable without significantly altering the supply chain.

Note; this paper focusses on the current potential rail-addressable market for parcels, it does not include other potential express freight markets such as urban convenience format supermarket deliveries, which could have an opportunity to utilise FMUs to re-stock stores, nor does it include the opportunities from Parcels as Passengers.

[1] Source ORR https://dataportal.orr.gov.uk/statistics/usage/freight-rail-usage-and-performance/table-1350-rail-freight-market-share/

Parcels as Passengers

Whilst this paper focusses primarily on the FMU concept of Express Freight, the SFU recognises the potential of using existing space on passenger trains to carry goods, where passenger demand allows. This concept of having “Parcels as Passengers” has the benefit of not taking up any additional timetable capacity, it is just using the existing railway system more efficiently, by utilising space that would otherwise remain unsold. This type of operation is already delivered in a commercial way on some key rail routes, delivered by Intercity Railfreight and their partner operators.

Network Rail and GBRTT have worked on a Visum network model, which has the capability to demonstrate how companies can use the passenger rail network to transport goods. The network model contains passenger timetables, rail maps, road maps and other layers of data which enables users to understand the challenges and opportunities of moving goods by passenger train. Along with tracking the market on Parcels as Passengers this output is likely to form a valuable resource for informing the GBRTT policies for both income generation from Parcels as Passengers, as well as decisions about integration with rolling stock development.

GBRTT SFU is working to assess the opportunities of Parcels as Passengers at a national level, including which stations have facilities which would lend themselves to this mode of express freight.

5. Challenges to Modal Shift

Considering the *Typical Parcel Carrier Operating Model* of parcel carriers, integrating rail into current supply chains will likely be limited to certain operators depending on a number of factors:

- Customer proximity to a suitable railhead
- Volume of HGVs moved across spokes of the network
    - Insufficient loads will mean some operations won't be commercially viable by rail due to the higher loading capacity of freight multiple units
    - Aggregation of volumes across multiple businesses would help address this challenge
- Current method of loading / unloading goods
    - Interviews with carriers suggest that loose loading parcel bags and packages in lorries prevents ready adoption of rail in the current supply chain
    - Operations by rollcages lend themselves to modal shift using existing FMUs, although work with end-customers suggests the efficiency could be improved with investment to methods more like those used in aviation
- Imbalanced loads / reverse logistics can mean it's challenging to meet cost expectations
- Pathing availability – paths need to meet operational requirements of the end customer, integrating with their existing network

6. Express Freight Rolling Stock

The last few years has seen the development of first in class modifications of a number of freight vehicles derived from passenger multiple units. The main ROSCOs which have been public in the work which they've undertaken are Eversholt Rail and Porterbrook. Varamis Rail are currently using FMUs to deliver goods between the Midlands and Scotland, moving goods on rollcages utilising existing parcel handling facilities at Birmingham International railway station and Mossend freight terminal.

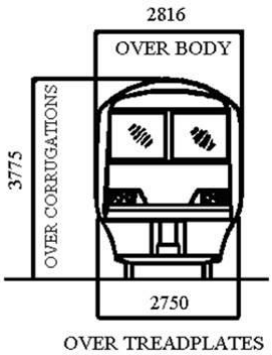
Eversholt Rail

To date the rolling stock company (ROSCO) Eversholt Rail have converted five of their 4 carriage Class 321 electric passenger trains into express freight trains, capable of carrying rollcages and parcel goods. The vehicles retain the operating characteristics of the passenger equivalent train, so are capable of 100mph operation. The units are fully electric vehicles, so are restricted in their operation to parts of the network with overhead line electrification (OLE).

Figure 5: Eversholt Rail Swift Express Unit (Left: Exterior, Right: Interior)

They come in sets of four vehicles: Two Driving Vehicles, one Trailer Vehicle and a Motor Vehicle. The dimensions are:

- The max door height is 1885mm. The max door width is approx. 1150mm



- Vehicle dimensions
  - Two Driving vehicles (DTC/DTS) - Floor area total 43.521 sqm, saloon area total 35.502 sqm sq M

- Trailer vehicle (ATS) - Floor area total 42.185 sqm, saloon area total 33.971 sqm
- Motor vehicle (MOS) - Floor area total 45.684 sqm, saloon area total 37.471 sqm

Orion / Porterbrook

Porterbrook has worked with Orion (part of Rail Operation Group) on freight conversions of the Class 319 electric passenger train and the Class 769 bi-mode train. The converted Class 319 vehicles allow for 100mph running on OLE routes, whilst the bi-mode units are fitted with a diesel motor which allows the units to run at 100mph on electrified and non-electrified railway routes.

The focus of this section has been kept to large volumes of goods which require an FMU. Passenger rolling stock can be used to transport smaller volumes of parcels on passenger services, where the train operating company supports this business model.

Future Developments

Through working with potential end users, it is clear that the FMU does not suit all the types of high-speed logistics operations, particularly where goods are loose loaded directly onto HGVs. Many of those carriers are still interested in a modal shift to rail, as it is seen as being a potential route to decarbonise their supply chain in the longer term. The challenge with switching to existing intermodal services is one of acceleration and speed. The current typical intermodal operation does not provide the speed of end-to-end journey to meet the requirements of next day outbound parcel operations. SFU sees this as being an area to explore further with potential end users to understand whether the barriers can be overcome.

The SFU sees value in exploring further the opportunity to run higher velocity intermodal trains, potentially with newer locomotives, shorter consists, which may in turn enable a better path to provide the required end-to-end journey for outbound time critical goods from the Courier, Express and Parcel (CEP) sector. The advantage of this approach is that it is likely to rely largely on existing rail terminal and wagon technology. We intend to work through this model with industry representatives to see whether this can provide a route to make rail a feasible part of the industry's decarbonisation strategy.

7. Terminal Requirements

By working with parcel carriers as potential end users of rail for express freight, it has become clear that one of the immediate barriers to modal shift is the double-handling of goods. Whilst the rail network has some encouraging overlaps with the parcel carriers' networks of warehousing, it currently lacks warehouse and cross-dock facilities directly linked to the rail network. This means that there are inherent inefficiencies with transferring goods from existing sortation warehouses to a suitably proximate railhead. This is with the notable exception of the Royal Mail, which makes use of a number of rail-connected sites for its current operations (Princess Royal Distribution Centre, Dallam (Warrington), Shieldmuir (Glasgow), Tyneside (Gateshead)), as well as its parcel handling hub at Daventry, due to commence during 2023.

In order to be accessible to a wider set of potential customers, the rail network needs to be better integrated into the supply chain with direct access the network. SFU can support this aspiration in a number of ways:

- Provide good quality information about existing rail freight facilities
- Work with market players on developing new facilities on the freight estate
- Advise developers of third-party land on matters of rail connectivity

Information on Railway Facilities

Getting information about the rail network and potential interchanges for those not familiar with working in rail is a challenge, especially regarding information relating to parcels and light logistics. The network facilities which were there to support similar commodities in the past have not necessarily been maintained.

Major Stations

For Express Freight operations, we must consider a broader range of the estate than the 'traditional' freight facilities. Railway stations present an opportunity to create the transfer point between road and rail, whether that is using passenger trains for small volumes of goods or with dedicated freight trains, such as a converted Class 769 or Class 321 Multiple Units.

The network of over 2,500 stations brings over 85% of the population within 5 kilometres of the railway, well within the range of electric delivery vehicles and cargo bikes. Given the growing interest in using the rail network for express freight and urban logistics, this network of stations, integrated with other railheads and Strategic Rail Freight Interchanges (SRFI), provide the means to best deploy rail within an overall high-speed door-to-door service. The rail industry can provide fast and frequent rail services, combining secure spaces on passenger trains with dedicated express freight trains. Stations then allow these rail services to connect with last-mile delivery vehicles, much better suited to the urban environment than articulated lorries.

Network Rail commissioned a review into major stations to assess their capability to handle express freight traffic, focusing primarily on the managed stations. The report can be viewed here[2]. City centre stations appear particularly well placed to integrate

[2] https://www.networkrail.co.uk/industry-and-commercial/rail-freight/freight-site-opportunities/

with eCargo bike deliveries for last mile delivery, where the concentrations of customers increases the viability of the service.

More recently, Cross River Partnership commissioned Steer to undertake a review into the opportunities to move goods by rail in Lambeth and Southwark Boroughs. The report, 'On track for Sustainable Logistics'[3] has led to a project looking in more detail at the opportunities to integrate a Freight Hub in the undercroft space at Waterloo station.

Mapping Existing Freight Facilities

GBRTT and Network Rail have undertaken work to provide greater transparency to potential rail users about the extent and facilities available on the existing rail network and associated connected facilities. This has so far been undertaken in a bespoke arrangement with individual companies approaching the SFU development team. Work is ongoing to make the information publicly accessible to allow organisations to undertake their own reviews of the rail network and its proximity to their facilities. This includes information on heavy rail terminals which allows for exploring co-location of cross docks on existing urban heavy freight sites.

Realising new Rail Connected Facilities

Former Parcel Sidings – Network of Cross-dock facilities

As we begin to see the outcome of recent industry trials, it is becoming increasingly clear that improving the efficiency of the transfer from road to rail is vital in making a successful transition to rail. Mapping and improving existing facilities to reduce the transfer between transport modes can provide better opportunities for integrating existing supply chains with rail. Seeing the effectiveness of using purpose-built parcel handling platforms used as part of some of the trial services has highlighted the opportunities to better utilise existing parcel platforms. As an example, Varamis Rail trial of running services between Mossend and Birmingham International have demonstrated:

- Using 4 x operatives it took approx. 20 mins to move 22 roll-cages from a standard 40ft HGV trailer into 1 x cl.321 carriage where the HGV dock is approx. 100m from the loading point on the platform
- Using 4 x operatives it took approx. 8 mins to move 22 roll-cages from 1 x cl.321 carriage to a standard 40ft HGV trailer where the HGV dock is approx. 10m from the rail interface

Noting this efficiency in operations has led to further investigations into the status and condition of a number of sites and facilities across the network which were formerly part of parcel and goods operation during the British Rail era. For example, there were a number of sites which provided a parcel platform with level loading facilities for HGVs, many of which have not seen operational use in decades, but remain largely in situ.

This assessment is ongoing and expected to deliver an output in 2023.

[3] https://crossriverpartnership.org/wp-content/uploads/2023/03/On-track-for-sustainable-logistics-Integrating-Rail-Freight-into-Londons-deliveries-Full-Report.pdf

Developing rail enabled distribution space on the Freight Estate

Values for warehousing and distribution space has been increasing markedly in values in recent years. It is a trend which looks set to continue. ***Error! Reference source not found.*** shows the projected revenue growth. With the notable exception of Royal Mail's new site at DIRFT3, rail connected warehousing aimed at the parcels and light goods distribution sector has not featured in recent years, carriers instead focused on locating for optimal distribution by road.

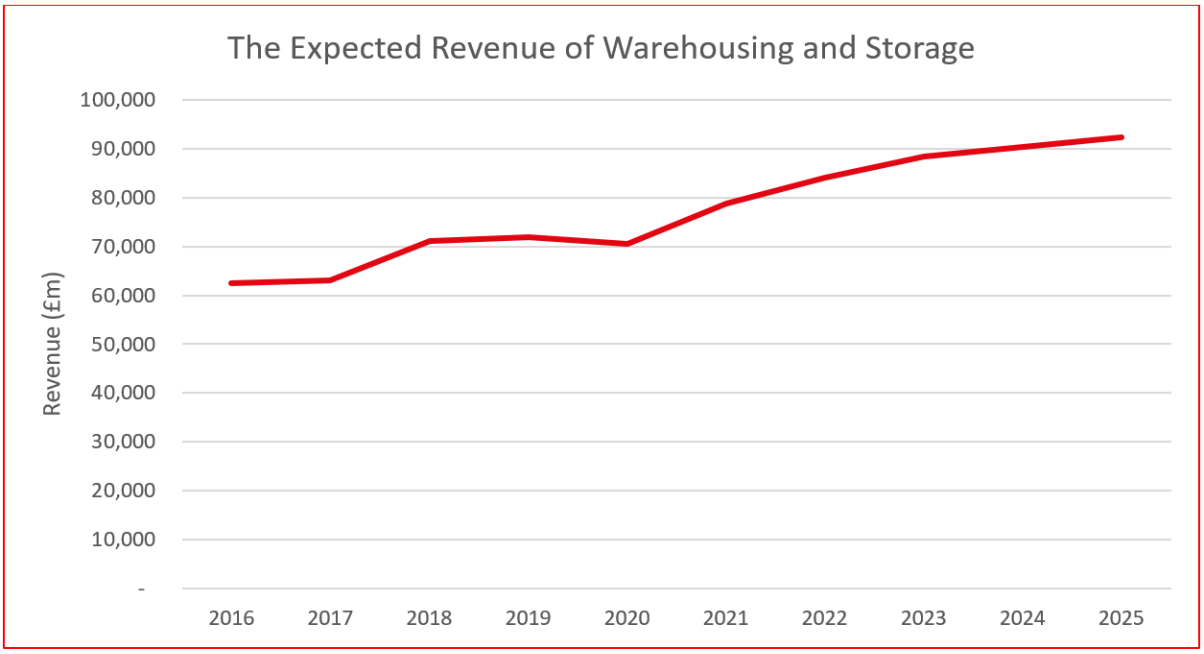


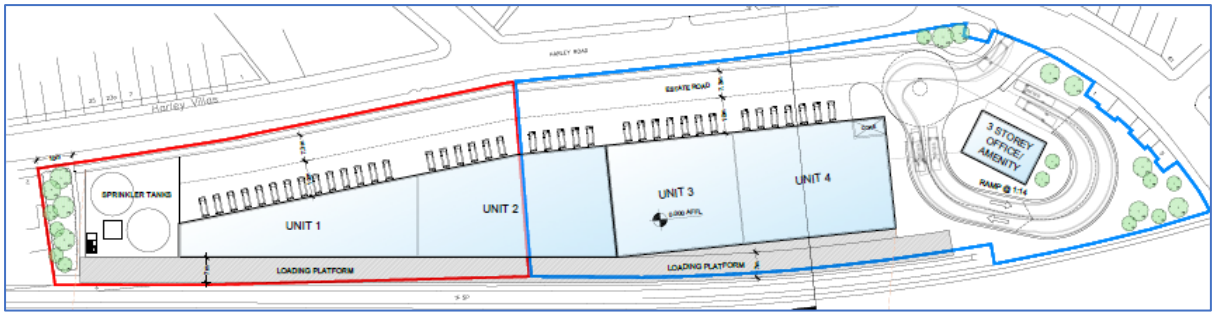
Figure 7: Forecast revenue growth in Warehousing and Storage

Freight estate developments

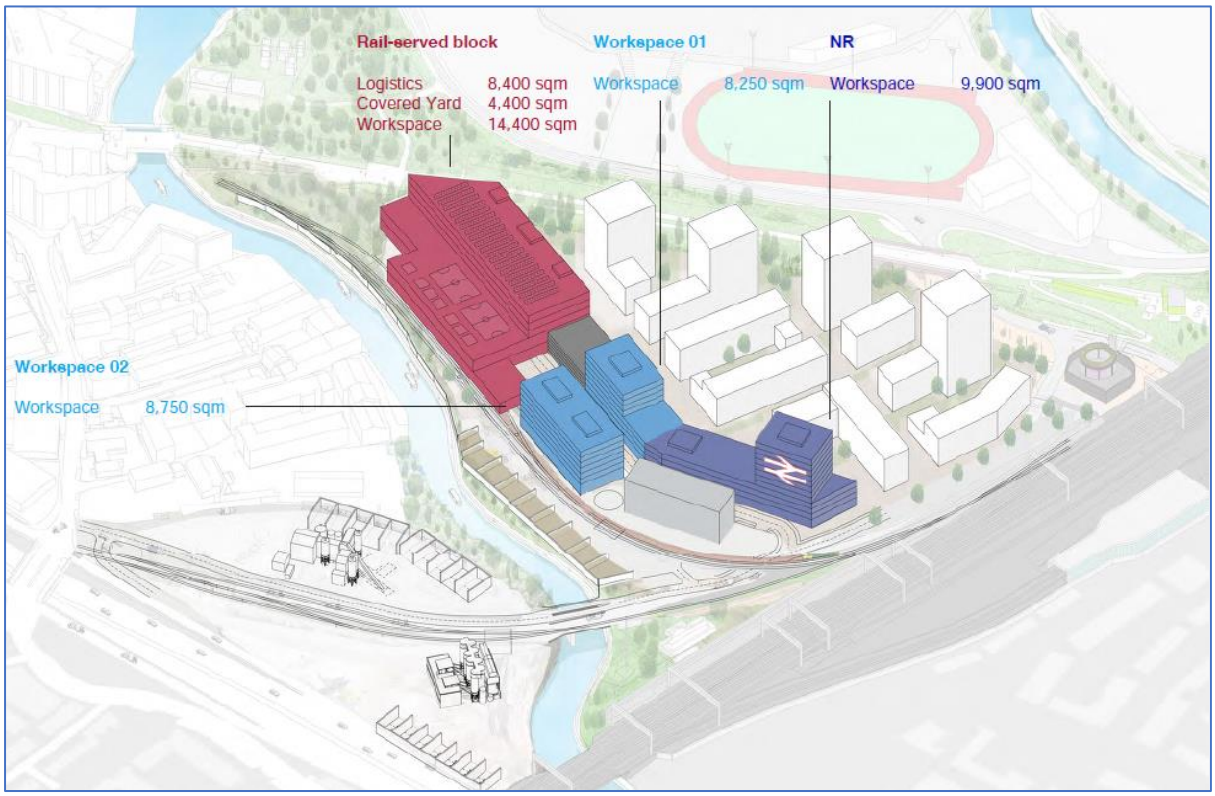
The SFU development team has been working with Network Rail Freight Surveyors on exploring opportunities for realising rail enabled urban warehousing development on the freight estate his with a view to both boosting estate revenues and enabling this emerging sector. Based on indications from developers and operators in the sector, some of the initial pilot sites under consideration are:

Willesden Distillers: 4-acre prime site, Metroline bus company and redundant building.

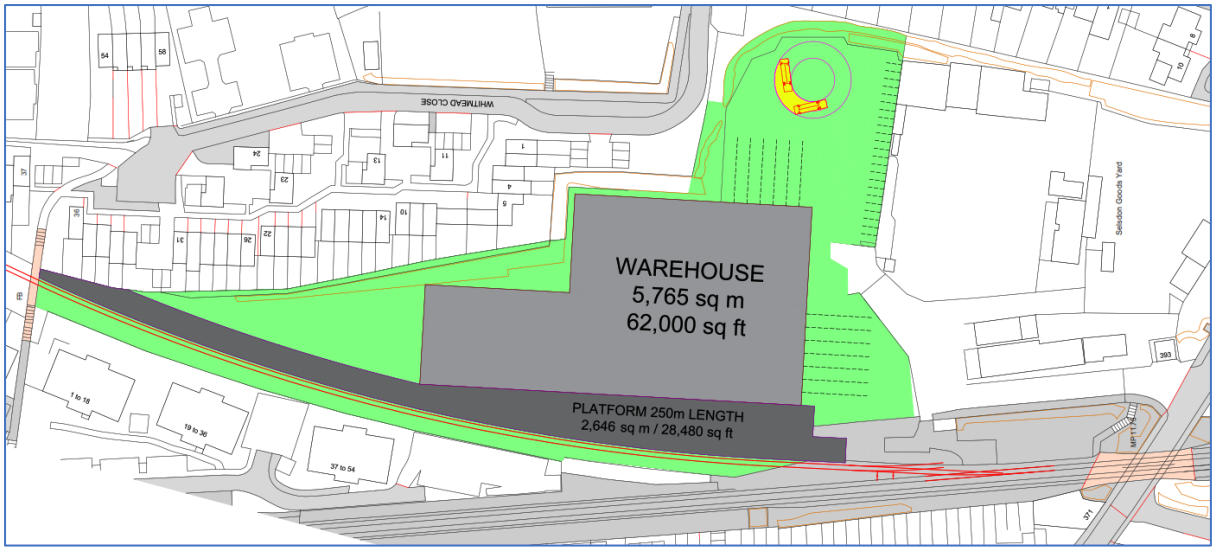
It is a small urban site which has the potential to deliver new express freight warehouse facility using JV to develop the scheme, aim to be 100% private sector funded. Looking to create opportunity for increase train utilisation 0 to up to 10 trains per week.



Bow in East London: JV in place to develop proposals. Opportunity to redevelop inefficient freight site to incorporate multiple uses. Alternative use will unlock improvements to site, and provide a new rail-fed warehouse for express freight. Increase site train utilisation from 10 trains per week to 15 trains per week.



Selsdon: Opportunity to affect re-installation of connecting trackwork to develop a rail connected urban distribution hub up to 5,765sq m warehouse with 250m platform. It requires developer input and participation with ArchCo for their site elements.


WHITMEAD CLOSE
WAREHOUSE
5,765 sq m
62,000 sq ft
PLATFORM 250m LENGTH
2,646 sq m / 28,480 sq ft
Selsdon Goods Yard
1 to 18
19 to 36
37 to 54

8. SFU Actions for growth:

- **Network Rail Station Estate** – work on proposals to develop an Urban Freight Hub at a Network Rail station to demonstrate how passenger stations can integrate with logistics supply chains and final mile deliveries
- **SFU / Network Rail estate strategy** – Working with carriers to understand the location and specification requirements for rail connected warehouses will provide a better supply chain for potential rail users, encouraging modal shift
- **Develop Passenger Network Model – Parcels as Passengers** Providing capability to assess passenger rail for parcel use with the Passenger Network Model. Inform the GBRTT policies for both income generation from Parcels as Passengers, as well as decisions about integration with rolling stock development
- **Rail enabled Urban Distribution space**– working with JV partners and private developers on progressing plans for new rail connected urban warehouse facilities on the freight estate.
- **Information about Parcel Platforms and Cross Docks** – Supporting the creation of a list and condition report of a number of parcel platforms and cross dock locations for transfers from rail to road will create more opportunities for integration of supply chains. Including exploration of co-location of cross docks on existing urban heavy freight sites
- **Developing Capacity** – using information from carriers, operators and terminal developments to inform advanced timetable planning processes (such as Event Steering Groups)
- **Develop the Express Intermodal concept** – set up an industry working group comprising of GBRTT, CEP logistics companies, freight operating companies and others to help investigate other rolling stock options to enable modal shift to rail in the CEP sector.

Appendix 1

Table from GBR Market Development Plan summarising activities looking into Express Freight and Urban Logistics.

Express Freight / Urban Logistics	Need for suitable micro-intermodal equipment.	Engage with 3PL's on equipment design	Inform rail related design requirements and if necessary, provide leadership.
	Need for urban interchange railheads.	Co-location of express freight activity at major stations. Co-location of express freight activity at existing urban heavy freight sites.	Identify and promote capacity and capability at major stations. Identify and promote capacity and capability at existing urban heavy freight sites. Identify layout or operational solutions. Identify and apply funding mechanisms.
	Need for rail enabled urban distribution space.	Proactive interrogation of railway estate to identify viable new site opportunities.	Identify sites for: development of rail enabled urban distribution space. and /or station options. Identify and engage investing developer partners.
	Need for suitable road / rail transfer points at / near major distribution centres	Proactive interrogation of railway estate to identify viable existing / new site opportunities.	Identify sites for: development of railheads at / near major distribution centres. Identify funding mechanisms to develop opportunities.