railfuture

The Castlefield Problem

A great opportunity for freight?

April 2020

The Castlefield Problem - a Great Opportunity for Freight

Introduction

Railfuture believes that railways should be the transport mode of choice if we are to balance the needs of the economy with those of tackling the *Climate Emergency* and campaigns for a bigger and better railway capable of carrying more freight as well as providing for ever increasing passenger demand.

Manchester's Castlefield corridor is a bottleneck and has become a byword for unreliability. It is expected to carry 12 passenger services and one freight train in each direction every hour.

This report recommends some medium to long term interventions aimed in particular at expanding the freight offering, since movement of goods by road is the most difficult to decarbonise and future demand is likely to exceed that available at Trafford Park.

The Problem

The Castlefield corridor is the mile of two track railway linking Castlefield Junction to the West with Manchester Piccadilly's platforms 13 & 14 to the East. It has 2 intermediate stations at Deansgate and Oxford Road.

The western end has junctions with the line to Liverpool via Widnes (off which branches the Trafford Park freight terminal), the Chat Moss line to Liverpool via Newton-Le-Willows, the line to Southport via Wigan, the line to Preston (for the West Coast Main Line) via Bolton and the line round to Manchester Victoria and on to Rochdale, Huddersfield and Leeds.

The eastern end has a junction with the main lines leading south east from Manchester Piccadilly. These divide into separate routes for services to Hadfield via Guide Bridge and New Mills via Marple which branch off at Ardwick Junction, services to Manchester Airport and Alderley Edge which leave the main line at Slade Lane Junction, and services via Stockport to Buxton, Chester via Altrincham, the Hope Valley line to Sheffield via Hazel Grove and the main lines to London. The latter divide at Cheadle Hulme to permit London bound trains to run via Crewe or via Stoke-on-Trent.

In total there are 12 off peak services an hour running in both directions.

In addition to the passenger services there are two freight trains every hour, one westbound and one eastbound into and out of Trafford Park freight terminal. During the day, these services nearly all head south for Crewe, Felixstowe, London Gateway and Southampton and are mostly routed via the *Styal Line*. This is the route to Crewe (via the Airport branch) that avoids running through Stockport. Because of their 500m length, freight trains take up more capacity on the Castlefield corridor occupying twice the number of track sections as a passenger train. The combined effect of this is that the line is running at 93% of its quoted capacity with only four minutes per hour available for timetable recovery in the event of a late running train. To maintain reliability, the line should only operate at 85% capacity to avoid a breakdown of the timetable. Delays and cancellations are therefore a regular occurrence.

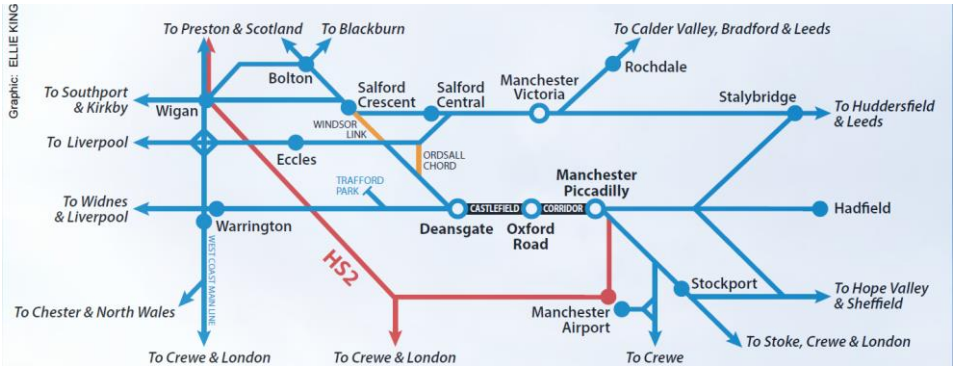


Fig. 1 *Map of rail routes around Manchester showing the Castlefield Corridor (Ellie King)*

How did we get into this mess?

Historically rail services into Manchester used either Piccadilly or Victoria stations but not both. Trains using the Castlefield line were limited to those between Manchester and Liverpool via either the *Cheshire Lines Committee* (CLC) route through Warrington or the Chat Moss route via Eccles. The construction of the *Windsor Link* broadened this range of services to include Southport and Bolton. Later the addition of the *Ordsall Chord* extended services from the Rochdale and Leeds direction through to Manchester Airport.
As franchise bids have been approved, so more services to the airport have been promised putting more strain on the network.
Meanwhile, the increase in intermodal freight traffic between Trafford Park and the southern ports has seen all the available freight capacity (known as *signalling paths*) taken up, with each freight train using the equivalent of two passenger paths.
As *System Operator*, Network Rail admit that they should never have agreed to all the timetables proposed in these franchise awards and is now in the unenviable position of deciding which services should be withdrawn amid protests from train operators and passengers alike, as all trains are full!

What about freight?

Freight has no choice but to use the Castlefield route. The only access to Trafford Park is from the east with no route available to join the West Coast Main Line (WCML) other than via Castlefield. Freight cannot deploy some of the tricks available to passenger services in order to recover from late running. It cannot turn back short of its final destination and ask its cargo to catch the next available service. Neither can it leave out stops to save time if it's journey is delayed. But, as freight doesn't complain on social media when it is late or cancelled, it is a popular target for politicians looking for a solution.

The impact of freight trains using the Castlefield route can be seen at Fig. 2

	Table of distances in metres	
	Between Stations and Junctions	**From Piccadilly Station**
Piccadilly Station	**0**	**0**
Piccadilly West Junction	*60*	*60*
Oxford Road crossover	*442*	*502*
Oxford Road Station	**301**	**803**
Deansgate Crossover	*282*	*1085*
Deansgate Station	**282**	**1367**
Castlefield Junction	*201*	*1568*

Fig. 2 *Freight trains are 525m long including the locomotive and 775m trains are proposed in future. On the Castlefield corridor, trains either occupy a station and two junctions or two stations and one junction, taking up the line capacity of two passenger trains.*

Have any alternatives been proposed?

The ideal solution would be to access Trafford Park from the western end. Network Rail's *Northern Hub Study* (2010) looked at this possibility to link Trafford Park with the West Coast Main Line. Two options were examined, one via Padgate and Dallam, the other via Glazebrook and Kenyon, but both were ruled out as the re-use of former lines has been frustrated by blocking development, including road construction, making these solutions prohibitively expensive. See Fig. 3.

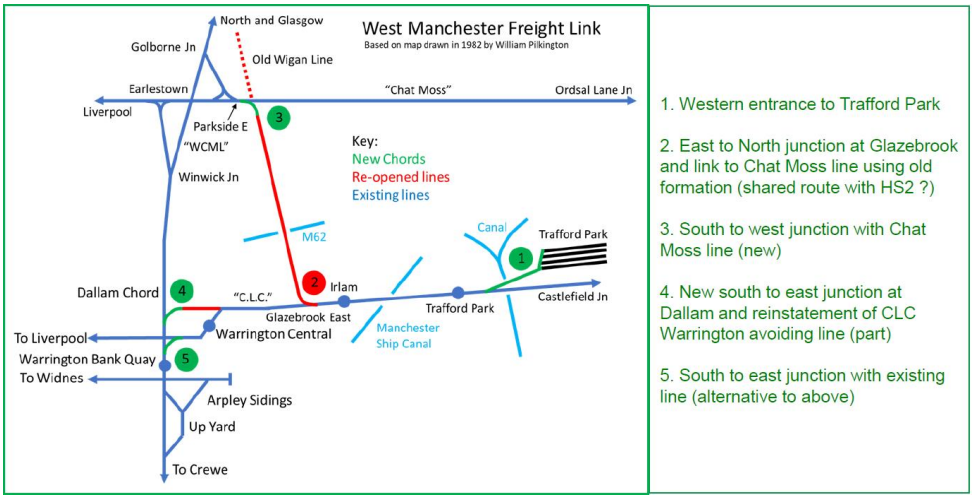


Fig. 3 *Routes west of Trafford Park (Paul Hollinghurst, based on an earlier 1982 map)*

Railfuture has recently revisited these options and come to the same conclusion. We have even looked at the possibility of joining the WCML via Parkside and Earlestown (2 & 3) but this has several disadvantages. Firstly, it takes freight on a northern detour when most of the traffic is for the south, secondly it requires a connection onto the busy Chat Moss route, thirdly, still routes everything via Crewe over 28m (44Km) of congested WCML and lastly has been severed by the M62 making it an expensive option.

Constrained

Whether freight enters the Trafford Park depot from the east or the west it first has to be shunted into one of two *reception sidings*. Because the unloading gantries are on separate sidings, of limited length, the train has to be divided into two portions. Each has to be carried into the head shunt and then propelled into the unloading area. This requires five train movements. When the unloading and loading operation is complete, the train has to be moved into the reception (despatch) sidings again before it is ready to leave. This requires a further five movements. For any train longer than 640m it would require 14 moves to complete the whole cycle! The limited number of gantry sidings also means that only one 700m+ train could be accommodated at any one time.

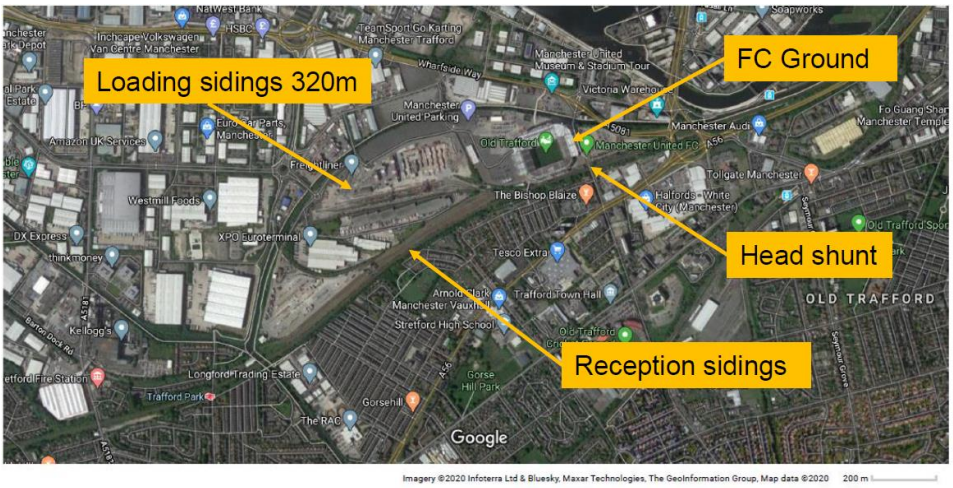


Fig.4 *Trafford Park – a convenient but constrained site*

A more fundamental question

All the proposals discussed so far have been based on tackling the problem as it appears today but, before advancing a potential solution, we need to consider how we want freight to develop in future. Making greater use of rail for freight is the most urgent priority facing any nation keen to wean itself off fossil fuel. As technology improves, electric cars may be suitable for passenger journeys, but many experts acknowledge that a move to electric powered lorries breaches the laws of physics, as batteries can never match the *energy density* of road fuel. Even with diesel traction, freight consumes only a third of the carbon per tonne Km if carried by rail rather than by road and, with electrification, uses just 10% of the energy with no CO2 emissions, assuming renewable generation.

We must therefore expect future demand for freight movement by rail to far exceed that of today, almost certainly exceeding the capacity available at Trafford Park.

Should we therefore simply defend the use of the present site alone or should we aim to maximise the role of rail in meeting the future freight requirements of the Greater Manchester area? Is it now time to look for another site? If so, where?

Can it be accessed from all parts of the network? At what cost? What consents will it require? What political support can it expect?

Carrington Park This brownfield site, once the Shell chemical works, lies to the south west of Manchester but still within Trafford Borough. Until its closure it enjoyed rail access via the former line between Stockport and the Warrington Central (CLC) line at Glazebrook. It is currently a Business Park, although the lorry parking facility in the area we are interested in could easily be relocated to another part of this vast and mostly empty site. Figs. 5 and 6 indicate its location and size.

Fig.5 *Location of Carrington Park showing access to the M60 and Trafford Park*

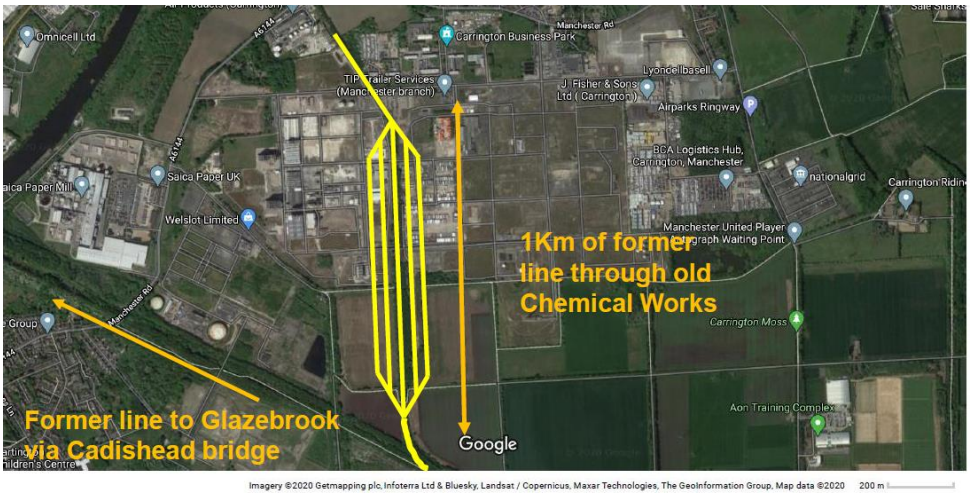


Fig.6 *Indicative sketch of the area that would accommodate a large freight depot*

A new depot on this site would be ideal in all important respects. It has plenty of room to service 775m freight trains without using separate reception sidings and enjoys convenient access for local distribution by short haul road transport being only 5Km from the M60. It is just 7Km from Trafford Park industrial estate and 10 Km from the current rail terminal with ample room to expand and accommodate rail related businesses. The rail line to this site would link to the rest of the network at Skelton Junction along formations unobstructed by blocking development and in use until the present century.

Fig.7 & 8

Skelton Junction looking west. The line to Glazebrook is on the left. To the right a service to Chester takes the line towards Altrincham

Looking east towards Northenden Junction. A service from Chester passes an overgrown goods loop, complete with signalling, on the right.

Originally, five lines converged at Skelton Junction. To the east and west ran the CLC route from Glazebrook East Junction to Northenden Junction. To the north the *Manchester South Junction and Altrincham* line ran into Manchester via Old Trafford, now converted to tram operation as part of the Manchester *Metrolink*. To the South is the CLC line to Chester and to the south west the former line to Warrington via Lymm and Arpley, now part of the *Trans Pennine Trail*. Although the Chester line joins the WCML at Sandbach via Northwich, linking this route to the line to Carrington would be impossible as there was never a west-to-south junction formation at this location and creating one today would involve demolition of residential property. See Fig. 9.

To find a route southward we must continue beyond Northenden Junction where the railway divides. The right fork takes us back into Manchester via Stockport but passes under the first of the WCML routes just north of Gatley. This branch of the WCML runs from Manchester to Crewe via Wilmslow and Styal, known as the *Styal Line*. This is the line to Manchester Airport as well as the route of choice for freight traffic avoiding Stockport. Here again here has never been a west to south junction and residential property runs up to the railway boundary.

The left fork at Northenden is a freight only line which also passes beneath the Styal line but here the elaborate sprawl of a grade separated junction between the M56 and M60 motorways present an impenetrable obstacle to the creating a junction. Beyond this point the line continues towards the former Cheadle Junction with the Midland Railway. Although lines to the north and west have long closed, the junction itself survives sweeping the line south eastwards passing beneath the line we left at Northenden. Shortly after it does so it also passes beneath the second of the two WCML routes, that between Stockport and Cheadle Hulme, where a further junction divides the WCML between the line to London via Crewe and that via Stoke-on-Trent. Although residential development prevents any prospect of a west to south junction here either, immediately to the east of the WCML there is an undeveloped former landfill site, owned by the Greater Manchester Waste Disposal Agency (GMWDA) where a junction could be the created. A possible arrangement is shown at Fig. 10

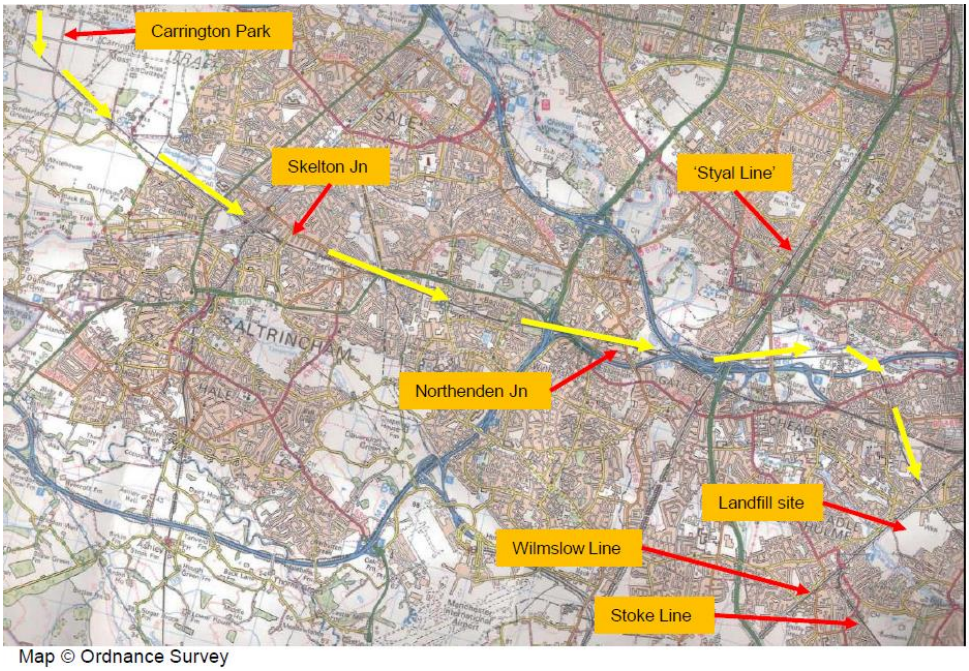


Fig. 9 *Route from Carrington Park to the potential WCML junction at Cheadle Hulme*

Fig.10 *Area at Cheadle Hulme showing potential for a junction between the freight only line and the West Coast Main Line*

Landfill site

The landfill is the green area to the east. Initial research suggests that it was last used in 1985 and that there has been no methane flared off since 2011, though monitoring continues. Although re-use of such land is not unknown, there is no immediate prospect of housing development. The grey portion in the middle is used for storing aggregate and road grit and to the west, the local household waste recycling facility. The freight only line forms the site's northern boundary for 500m east of the Adswood Road bridge, enough for both west and east facing junctions to be formed. Clearly there will be some geo-technical issues associated with building a railway here but this will be reflected in the value of the land.

Connecting to the West Coast Main Line

There are two options for a main line connection. One is to join just north of Ladybrook Viaduct, avoiding the construction cost of a second viaduct over the valley. However, this is where the four lines south of Stockport merge into two and, as there are nine trains per hour along this section, would be nearly as congested here as at Castlefield. It would also mean that the vertical separation between the freight line and the WCML would have to be closed within about 1Km requiring a gradient of about 1/200. Since we also need to negotiate a curve at the foot of this incline it would be better to connect further south.
The second option therefore crosses the valley by means of a new bridge, easing the gradient to a more freight-friendly 1/300. It also makes possible a junction arrangement with Cheadle Hulme North Junction that avoids many of the conflicting moves with other services as this is where the nine trains per hour divide; five towards Wilmslow and five to Stoke-on-Trent. Though some of these may later transfer to HS2, we will assume there will be no net reduction in future demand. The diagrams at Figs. 11-13 help to show possible options for a new junction.

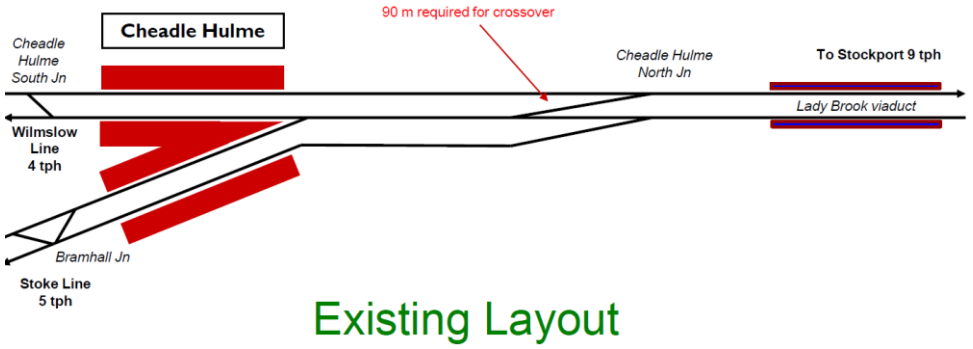


Fig.11 *The current layout shows the Down Stoke sharing track with the up Wilmslow*

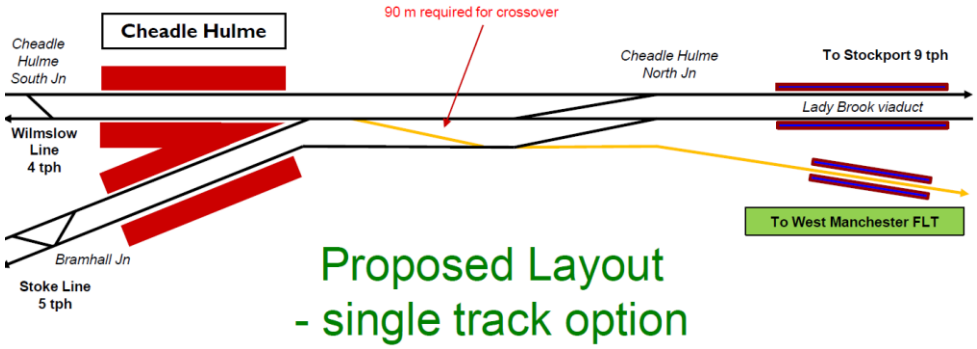


Fig.12 *This is the simplest arrangement to establish the new junction*

Although the intention is to avoid Crewe whenever possible by using the Stoke line, access to the Wilmslow line must be maintained. Freight from Manchester however will conflict with 14 tph (nine *with flow* and 5 *contraflow*) and from Crewe conflicts with all 18. Freight from Manchester via Stoke will only have a *with flow* conflict with 5tph but in reverse, conflicts both with the up Wilmslow line and with the up and down Stoke lines unless gaining the up Stoke at Bramhall junction 800m further south.

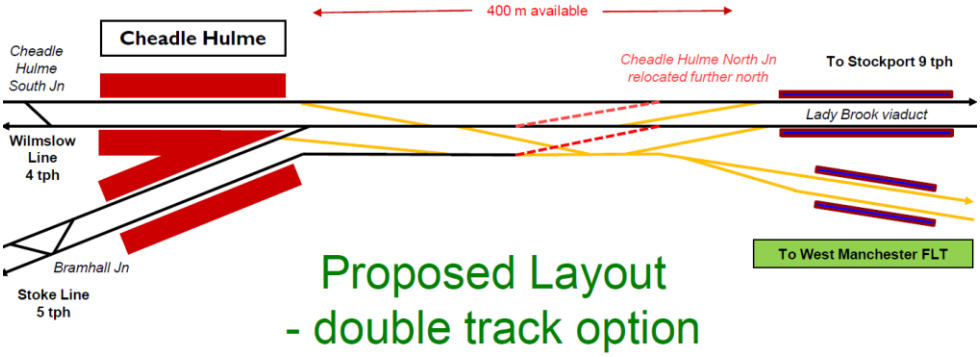


Fig.13 *A double junction avoiding conflict with the Wilmslow line*

This preferred arrangement permits access to the Stoke line avoiding all conflict with the Wilmslow line. It also avoids freight conflicting with itself by making the new bridge double track which also assists regulation (we only build it once!). Both options avoid widening the embankment south of Cheadle Hulme North Junction though this junction may need to be moved a little closer to Ladybrook Viaduct if we wish to avoid contraflow movement between here and Cheadle Hulme South Junction, 1,200m to the south on the Wilmslow line.

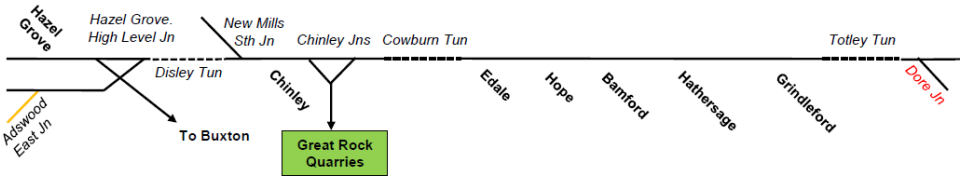
Fig.14 *Looking north from Platform 3 at Cheadle Hulme. Wilmslow lines to the left. Stoke lines in the foreground. An new crossover is required between the up and down Stoke lines roughly in the position of the scrap rail in the picture.*

The line to Stoke

Freight traffic using this line can exploit two legacy refuge facilities between Cheadle Hulme and Stoke-on-Trent. At Longport, the former Esso sidings include a 680m loop on the up line and a 945m siding on the down line which could be converted to a refuge loop. At Grange junction 3Km further south, the up goods loop is 2.5Km long and a down goods loop 1.9Km, easily enough to store two 775m trains. Longport is 41Km south of Cheadle Hulme, broadly comparable to the 30Km between Trafford Park and the Chelford loops via Styal.

East facing junction at Adswood

Fig. 10 showed that we had sufficient room to provide an east facing junction. This would permit the movement of aggregate traffic from the Great Rock quarries to access the WCML at Cheadle Hulme without the need to run via Altrincham.



West of Chinley Junctions	
Chinley Nth Jn - New Mills Jn (m:c)	3:68
New Mills Jn – Hazel Grove H.L. (m:c)	5:19
Total (m:c)	9:07
Number of Stations	1

East of Chinley Junctions	
Chinley East Jn – Dore Jn (m:c)	19:46
Number of Stations	5

Fig. 15 *The position of the Great Rock Quarries relative to Adswood.*

The new junction at Adswood therefore provides additional route capacity for southbound aggregate traffic avoiding both Crewe and Dore junctions. There are two daily trains, to Northampton and to Acton Yard, that use the Trent Valley line and undertake a northward detour of 19 miles from New Mills junction via Romiley, Hyde, Guide Bridge then back south via Heaton Norris Junction and Stockport taking an hour and 15 minutes to cover less than eight miles to Adswood. Besides aggregate traffic, the new route also offers diversionary options for container traffic to/from the freight terminals at Garston (Liverpool) and O'Connors at Ditton (Widnes) also avoiding Crewe.

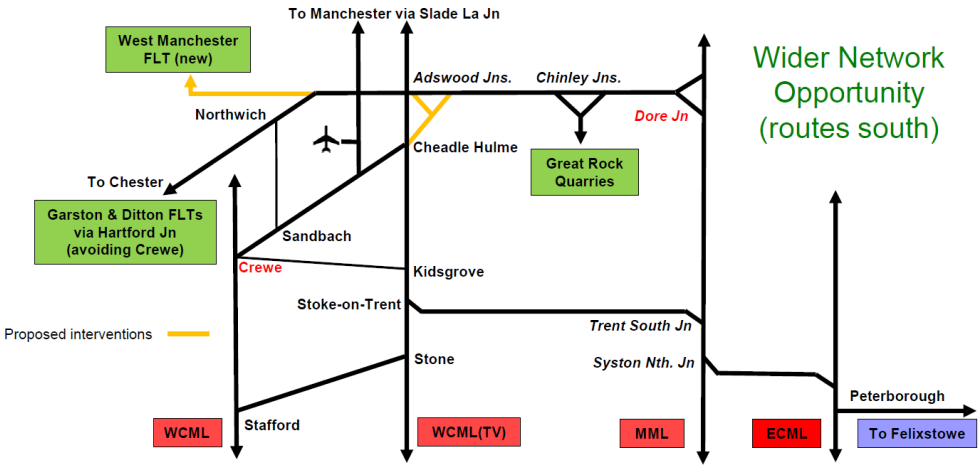


Fig.16 *The potential benefits of the new route and junctions at Adswood*

Eastwards from Carrington

Diverting aggregate trains away from Stockport also releases capacity for traffic from the new terminal at Carrington to access the Diggle route via the Northenden, Edgeley and Heaton Norris Junctions through Guide Bridge, provided regulation of these trains through Stockport can be achieved. Currently, access from Trafford Park to the east and north via Diggle is only possible by crossing the station throat at Piccadilly to reach Ardwick Junction.

Western access to Trafford Park

Even with the Carrington Park terminal fully established, Trafford Park will continue as a freight facility serving many rail dependant businesses in the locality. Access from the west can be achieved by extending the Carrington line northwards to link with the CLC line west of Flixton. Besides the construction of a western access to Trafford Park itself, the line would need to cross the river Mersey at Flixton to join the line through Carrington Park with the main line. Here there is an option to follow a westerly alignment along the former route into the old coal fired Carrington power station, which has since been replaced on the same site by a modern gas fired plant occupying a smaller footprint. This has however inherited the old switch gear to link with the national grid where the cables may be too low to pass over the railway. A more easterly alignment might therefore be required. Fig.17 shows these options.

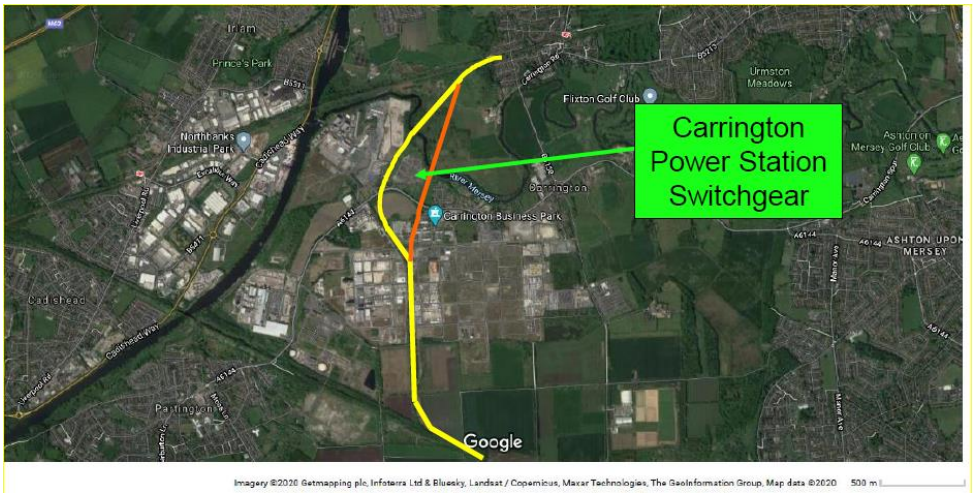


Fig.17 *Options for access to the CLC line at Flixton through Carrington Park*

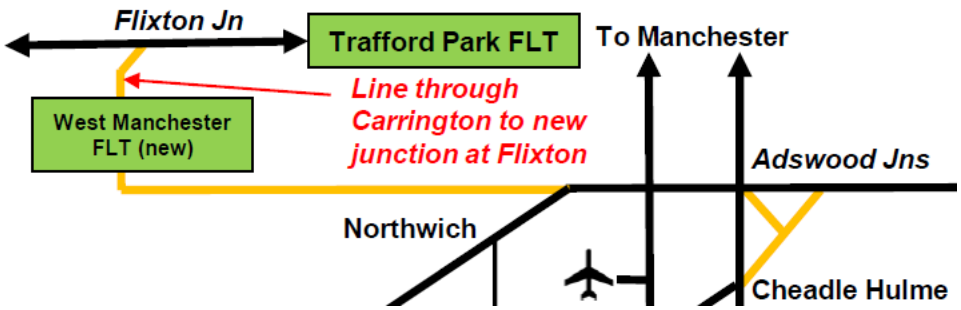


Fig.18 *Section of Fig.16 diagram showing western access to Trafford Park*

Benefits of the proposed interventions

- A new fit for purpose freight terminal for Manchester which is:
    a. more efficient to operate with fewer shunting moves
    b. capable of taking longer trains
    c. offering a major economic regeneration opportunity on brownfield land
    d. making a significant addition to freight handling capacity in the Greater Manchester area
    e. conveniently located for rail access from many parts of the UK rail network

- A new strategic freight route serving up to five key sites, including Trafford Park, while avoiding busy junctions at both Crewe and Dore to access each of the four principal lines to the south

- Relieves pressure on passenger services
    a. On the Castlefield Corridor
    b. Between Stockport and Manchester
    c. Between Manchester Airport and Slade Lane Junction

We understand that Network Rail place a value on achieving two train paths per hour per direction (four paths in total) on the Castlefield Corridor at around £800m over a 60-year appraisal period. The proposed works would include:

- The double junctions at Adswood
- The 1.5Km link line to the WCML at Cheadle and associated connection
- Relaying the line to Carrington and laying out the new freight yard
- Electrification of the route to Carrington

Benchmarking against the outturn prices of similar projects undertaken elsewhere and allowing for inflation, we expect the costs to come in under £300m. This does not include potential third party investment or assume any release value of eventual redevelopment at Trafford Park. Adding the connection at Flixton would probably add a further £100m, still giving an overall BCR of over 2:1.

Another connection to the north?

Various proposals have been put forward for the reopening of the line Between Skelton and Glazebrook East Junctions via the Cadishead Bridge over the Manchester Ship Canal. The latest comes from three Members of Parliament representing *Worsley & Eccles South*, *Stretford & Urmston* and *Atltincham & Sale* with support from both TfGM and Salford Council. They are all anxious to restore passenger services to Cadishead and Partington both of whom lost in November 1969 However this proposal is likely to be very expensive depending on the condition of Cadishead bridge but a business case that includes freight might look more attractive.

Although 80% of the Trafford park's freight traffic is between Manchester and the southern ports, a north to west curve to the south of the new Carrington Park terminal could develop traffic to the north of Manchester, including currently suppressed demand between here and Tees Port to the north east.

Shortly after joining the CLC line at Glazebrook East, trains would leave this line at the former Glazebrook West junction and follow the formation of the former *Wigan Junction Railway*, later part of the *Great Central* (GCR). This section is planned to be part of HS2 Phase 2B which joins the WCML at Bamfurlong and currently under review as part of the plan to integrate HS2 with Northern Powerhouse Rail (NPR). If this is built, the freight line could share the HS2 formation and access the WCML as shown in Fig. 19. As this route has been severed by the M62 (Fig.3), its cost would probably be prohibitive if built only for freight.

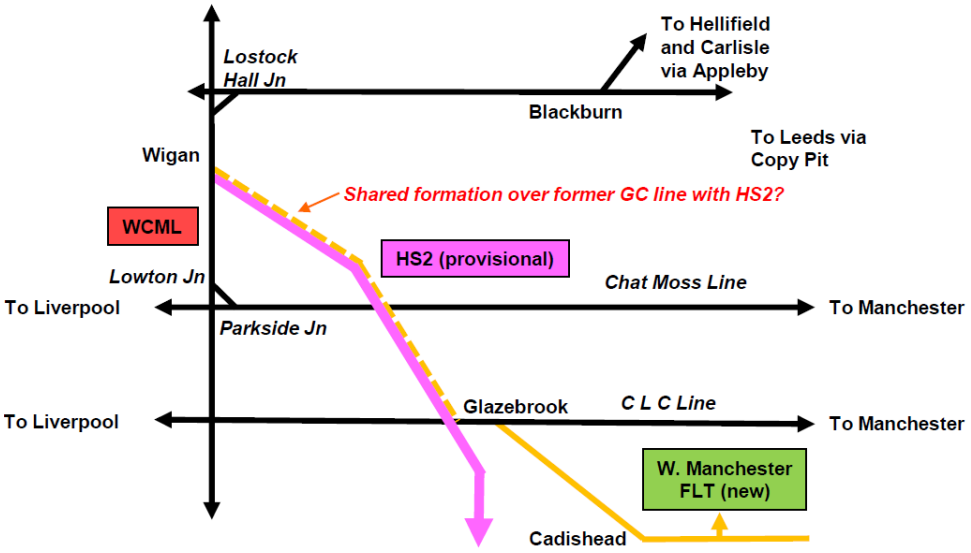


Fig.19 *How the new terminal might be connected northwards via Cadishead*

Summary and recommen-dation

Freight is not the Castlefield Corridor's biggest problem, though an alternative route would help improve the reliability of existing passenger services.

The Castlefield Corridor is however a problem for freight if this is to be given the capacity to grow.

Castlefield is not Manchester's only problem. An alternative freight route also releases capacity on the lines south of Manchester via both Stockport and Styal.

Finding a new freight terminal for Manchester is also a project of national importance. By volume, it is the most important of the inland destinations for containers from both Felixstowe and Southampton ports and rail must be given the capacity to capture future growth including currently suppressed demand. Birmingham boasts three terminals (at Birch Coppice, Hams Hall and Lawley Street), but there is only one at Manchester.

It is recommended that the proposals outlined in this paper be taken forward for further development by stakeholders through the Rail Network Enhancements Pipeline (RNEP) and that a full business case prepared to support the eventual Development Consent Orders (DCO) required to bring them to fruition.

Potential stakeholders include:-

The Mayor of Greater Manchester	*Spatial strategy. Political support*
Transport for Greater Manchester	*Potential development partner*
Transport for the North	*Potential development partner*
Department for Transport	*Potential development partner*
Network Rail	*Scheme Sponsor. RNEP/DCO application*
Trafford Borough Council	*Local Plan Authority (Carrington site)*
Stockport Borough Council	*Local Plan Authority (Adswood site)*

Castlefield a Great Opportunity for Freight

Halfway to Northampton. The Briggs sidings to Northampton Castle Yard aggregate working crossing Ladybrook Viaduct near Cheadle Hulme North Junction

Front Cover Photo: A Trafford Park to Southampton Western Docks freight train approaches Platform 13 at Manchester Piccadilly. To the left, the rear of a train to Trafford Park from London Gateway.

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Other acknowledgements appear in the text.

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