Leigh Area Rail Study

Study Report

Document Version: 5.0

FINAL

Transport for Greater Manchester
and Wigan Council

January 2012

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Transport for Greater Manchester and Wigan Council

January 2012

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4.0	20 December 2011	Final Report to TfGM, WC, WBC and NR	DG	DG	DC
5.0	3 January 2012	Final Report to TfGM, WC, WBC and NR	DG	DG	DC

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Executive Summary

Introduction

A study has been completed for TfGM and Wigan Council, working in conjunction with Network Rail and Warrington Borough Council, to examine a strategic high level transport business case for rail service and infrastructure improvements in the Leigh Area.

A range of options were considered and following a sifting exercise, a number of preferred options were identified. The criteria for sifting the preferred options included assessment of rail operational issues (reflecting the proposed Northern Hub changes), policy fit, value for money, deliverability and affordability. This sifting process was based on a standard methodology adopted for many major transport projects seeking funding from Central and Local Government.

Preferred Options and Costs

The preferred options, accompanied by the capital and operating costs of each, are summarised in Table 1. The range covers a new station in the Pennington area (south-west of the Atherleigh Way / St Helens Road junction and adjacent to the fire station) with services operating to Manchester, Warrington and Liverpool, and a shuttle service to a new station on the Chat Moss line (all proposed on the existing rail line would be in Warrington Borough, so outside of Greater Manchester). Also included in the options is a new station on the Chat Moss Line at either Glazebury or near Kenyon. All services and stations are assumed to have a half-hourly service in each direction of travel, to fit with TfGM minimum desired service level. Tests have considered a less frequent service at hourly.

Initial rail operational assessments have been completed assuming the proposed Northern Hub infrastructure improvements and timetable adjustments being developed by Network Rail in consultation with the Train Operating Companies and Passenger Transport Executives. The ability to accommodate additional Leigh Area services is dependant upon the location, for example what is possible along the Chat Moss line might not be possible elsewhere. The Chat Moss route is likely to have capacity for additional trains because, with the proposed three minute headways, in theory 20 tph should be possible, but in practice Network Rail run at a maximum of 80% of capacity, to allow for the mix of train types, stopping patterns and freight trains. Therefore 16 trains per hour are likely to be the maximum number that can be operated on the Chat Moss line; however constraints elsewhere on the network also have to be taken into account.

Travelling eastwards to Manchester from Leigh, the first major constraint is the Ordsall Lane Junction where the Chat Moss line crosses routes from Bolton and Wigan to Piccadilly. The corridor from Castlefield to Piccadilly is already at capacity under the Hub proposals which means that any new Leigh area services would have to serve Victoria. Westwards towards Warrington Bank Quay and Liverpool Lime Street, further network constraints restrict additional services being added to the network without other services being displaced or reductions in service stopping patterns.

Based on initial assessments of potential demand catchments and evidence from existing stations in the local area, it was very evident that the main access mode to any of the new station options would be car. This is due to the lower density population areas within a reasonable walking distance catchment (800m based on evidence of existing rail stations) and the limited bus services routing in close proximity. Costs for a park and ride site, including highway improvements, have been investigated. A station at Kenyon requires a new link road between the East Lancashire Road and the

station site. Proposals for park and ride, of up to 350 spaces, may not be fully supported through the emerging local transport strategies due to limited sustainable travel options, and could generate localised transport concerns for neighbouring communities.

Table 1: Summary of Options

Option	Total Infrastructure Costs	Annual Operating and Maintenance Costs
Option 1 - Pennington to Manchester Victoria Service	£63.1	£4.6
Option 2 - Warrington to Manchester Victoria via Pennington	£101.3	£7.5
Option 3 - Pennington Station with rail shuttle service to Kenyon, plus link to Leigh Town Centre	£47.9	£2.1
Option 4 - New Station at Glazebury	£11.1	£0.5
Option 5 - New Station at Kenyon with Road Link and Bus Shuttle Services	£17.2	£1.2

Note: all values are presented in £m's in 2016 outturn prices (including Optimism Bias at 66% based on DfT WebTAG standard rate for a rail scheme are preliminary stage of design).

Appraisal of Options

The value for money analysis included an economic appraisal, which required the generation of the DfT's BCR values. The benefits of the options were estimated using the TfGM SPM2PT model (public transport assignment model) for the County, a local Park & Ride Model and the standard TfGM appraisal template. Included in the template were revenue impacts for all public transport modes and scheme costs, including capital, maintenance, renewals and operating costs.

The do-minimum network against which options were compared included the Northern Hub infrastructure and service pattern proposals, electrification of the Chat Moss route, the Leigh Salford Manchester Busway and other committed TPD – Transport Development Programme - schemes in the County. Development assumptions for the Leigh Area were reviewed in the appraisal process to reflect the latest proposals. The assumptions indicate significant growth in the area, pointing to potential opportunities for rail travel in the future.

The headline results of the demand and revenue forecasting and the value for money appraisal are reported in Tables 2 and 3. The first table presents the economic appraisal results and the second table provides a comparison of revenues and also operating and maintenance costs.

The net annual revenue figures generated for each option are compared against operating costs, as shown in Table 3. All options fail to generate enough revenue to cover operating costs, hence a subsidy would be required of over £5m p.a. (2016 prices) for Option 2.

Table 2: Economic Appraisal Results

Option	Annual Passenger Demand	Benefits PVB	Costs PVC	Benefits: Cost Ratio BCR
Option 1- Pennington to Manchester Victoria Service	375,000	60.6	68.3	0.89
Option 2- Warrington to Manchester Victoria via Pennington	567,000	111.6	120.2	0.93
Option 3- Pennington Station with rail shuttle service to Kenyon, plus link to Leigh Town Centre	270,000	4.8	47.0	0.10
Option 4- New Station at Glazebury	144,000	9.3	7.4	1.25
Option 5- New Station at Kenyon with Road Link and Bus Shuttle Services	303,000	20.0	14.3	1.40

Note: all benefits and costs are presented in £m's in 2002 present values

Table 3: Financial Impacts

Option	Annual Gross Revenue	Annual Net Revenue	Annual Operating & Maintenance	Annual Subsidy
Option 1- Pennington to Manchester Victoria Service	£2.6	£1.6	£4.6	£2.9
Option 2- Warrington to Manchester Victoria via Pennington	£3.6	£2.2	£7.5	£5.2
Option 3- Pennington Station with rail shuttle service to Kenyon, plus link to Leigh Town Centre	£0.6	£0.4	£2.1	£1.6
Option 4- New Station at Glazebury	£0.4	£0.3	£0.5	£0.2
Option 5- New Station at Kenyon with Road Link and Bus Shuttle Services	£1.5	£0.6	£1.2	£0.6

Note: all values are presented in £m's and in 2016 outturn prices. Fare growth is assumed to be RPI+1% p.a.

The forecasting of demand and revenue, and the subsequent appraisal of options, has demonstrated that the Pennington station options (1 and 2) generate a strong level of demand that is comparable to other stations in the area. Levels of passenger benefit are also high, reflecting the travel time savings these options would generate. However, given the very significant capital and operating costs for the schemes, the value for money case is poor and the transport economic benefits fail to exceed the costs, and the revenues fail to cover operating costs leaving a very significant subsidy requirement. In order for a scheme to gain funding approval from the Department for Transport, the benefits must be at least 2.0 times the costs. Hence, the option of a station in Pennington, with rail link, would not pass the basic criteria set by the most important UK funding agency. The appraisal does not include wider regeneration benefits, as the appraisal has focussed purely on transport benefits at this stage of the assessment. This approach is consistent with the requirements of the DfT for a major scheme bid.

The options (3, 4 and 5) for a new station on the Chat Moss line with access mode improvements provided through better highway links to the site and a network of feeder bus services, provide moderate demand levels and benefits. The benefits of option 4 only just cover costs and for option 5 are above 1.0 the costs, but well below the value of 2.0 required by the DfT for possible funding. The benefits of strong bus feeder services are shown in Option 5, and there could be merit in linking such services to the committed LSM – Leigh Salford Manchester Busway.

The case for the scheme is very sensitive to assumptions on cost and the potential negative impacts to through passenger demand resulting from increased journey times in the timetables to accommodate the additional stop. If the latter is increased, the station reduces in value for money to a BCR just above 1.0. Option 3, the shuttle service, has a BCR of only 0.1. The appraisal reflected increased traffic congestion in the future and the larger time savings benefits the rail service will offer over the car.

The headline results of a number of key sensitivity tests on Options 2 and 5 are provided in Tables 4 and 5.

Table 4: Sensitivity Testing – Option 2

Sensitivity Test - Option 2	Benefits PVB	Costs PVC	BCR
Option 2- Warrington Bank Quay to Manchester Victoria via Pennington	**111.6**	**120.2**	**0.93**
Option 2 - Fares at RPI+3%	102.1	100.8	1.01
Option 2 - Exclude Staffing and Booking Office	111.6	115.1	0.97
Option 2 – Reduced Rolling Stock Requirements by 25% so reducing leasing costs	111.6	101.3	1.10
Option 2 - Stobart Costs	111.6	106.8	1.05
Option 2 - Stobart Costs with Hourly Service	88.2	76.1	1.16
Option 2 - Stobart Costs, Hourly Service and Higher Growth	103.2	69.9	1.48
Option 2- Assume 44% OB instead of 66% OB	111.6	115.3	0.97

Note: all benefits and costs are presented in £m's and in 2002 present values as required by DfT for a major scheme business case.

Table 5: Sensitivity Testing – Option 5

Sensitivity Test - Option 5	Benefits PVB	Costs PVC	BCR
Option 5- New Station at Kenyon with Highway Link and Shuttle Buses	**20.0**	**14.3**	**1.40**
Option 5 - Fares at RPI+3%	18.3	9.1	2.02
Option 5 - Higher Demand Growth	23.4	12.2	1.92
Option 5 - Unstaffed Station and No Booking Office	20.0	13.5	1.48
Option 5 - Greater Disbenefits to Through Passengers	16.0	15.5	1.03
Option 5 - Less Feeder Services	13.9	12.8	1.09

Note: all benefits and costs are presented in £m's and in 2002 present values as required by DfT for a major scheme business case.

Recommended Strategy

Considering the findings of the study, the following recommendations are made for further action should a decision be made to continue to promote rail improvements in the Leigh area.

Regarding the Pennington station options, the costs of constructing a station and spur, plus the operating costs of the new service are high when compared to the projected benefits. Whilst the forecasting shows strong demand and revenue for a station at Pennington, the net operating subsidy is high, meaning that it is challenging to see how this option could be taken forward solely in a transport context. A wider business case, which included regeneration benefits to Leigh, could be explored in the context of supporting potential future funding bids, but the significant gap between costs and projected benefits of the scheme must be recognised.

The options for a station sited on the Chat Moss railway line station also have overall benefits that are relatively low in relation to the costs, and fall short of current DfT guidance for taking transport schemes forwards.

Recognising the challenges set out in the report, the ability to take any of the options forward would require significant funding given the assessments against DfT business case requirements. The actions below are suggested in order to take advantage of any future funding opportunities:

- **Funding Routes.** There would need to be an investigation of all possible other sources of funding for the scheme, including for example funding sources related to regeneration programmes, or development-led contributions. The opportunities for new developments around the proposed station sites are however limited by Green Belt and other constraints. This study case has considered only the transport benefits of the proposed options. There may be merit in the scheme being reviewed in terms of the wider economic regeneration benefits (e.g. GVA benefits). Such work was outside the remit of this study.

- **Operational Assessment.** There would need to be a detailed assessment of possible railway timetables (including the impacts to all services in the Chat Moss corridor), and an understanding of any increased travel time to existing passengers through additional stops or reliability issues. Issues need to be assessed given the possible impact of other proposals in the Northern Hub timetables, as the changes in the Leigh Area services may have wider negative consequences.

- **Scheme Costs.** There would need to be detailed surveys and more robust estimates of costs, including capital and operating costs, to ensure all items are covered and risk and contingency are fully reflected.

- **Baseline Demand.** Given the high proportion of existing rail demand forecasted to switch to using the new stations, a better understanding of current travel patterns at these stations is suggested. Also, the forecasting models used for the assessment are very focused on trips within and to Greater Manchester; hence more travel data representing Leigh area trips to Warrington and Merseyside should be collected.

Given the challenges associated with the options set out above there may also be merit in examining options that improve access to existing railway stations.

1 Introduction

1.1 Report Purpose

This report has been prepared for Transport for Greater Manchester (TfGM) and Wigan Council, working in conjunction with Network Rail and Warrington Borough Council, and looks at the operational and transport economic case for heavy rail services to be introduced in the Leigh area.

1.2 Project Overview

The Leigh Area Rail Study seeks to recognise the views of the people of Leigh, and inform the process of determining what transport options should be developed in order to enhance the Leigh area. The study area is shown in Figure 1.1 in the context of the heavy rail infrastructure that currently exists beyond the Leigh urban centre.

In developing the strategy a number of key issues have been addressed. The prime aim is the inform the transport strategy for the Borough of Wigan, and to do so in time to feed into the consultation process due to commence later in 2011.

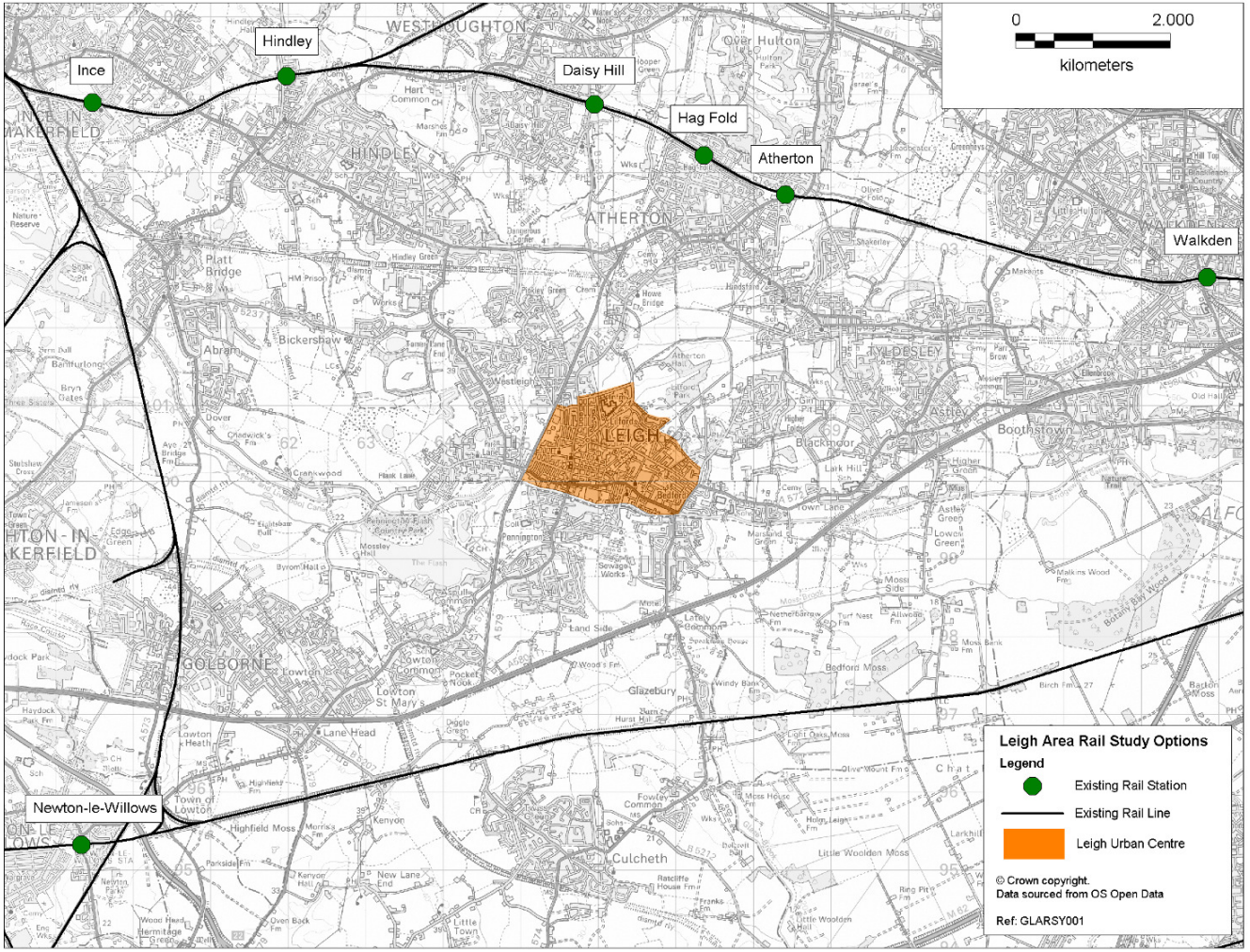
The North West is in the process of a major overhaul of the rail offer to passengers. Capacity constraints at some key centres in the Manchester area in particular will be relaxed as a result. On this basis the opportunity presents itself to do so much more with the rail offering in the region. The Leigh area is particularly poorly served by rail services. Resulting high car mode share and increases in population through housing developments are exacerbating congestion on the regional highway networks.

The identification of the problems in the area and opportunities presented by committed and proposed rail investment make the Leigh proposals opportune in timing with the potential to provide sustainable solutions to transport issues in the area.

The Transport for Leigh campaign (TfL) is advocating proposals for heavy rail in Leigh that would provide a link from the Chat Moss (Manchester to Liverpool, via Newton-le-Willows) line, to a new station in Pennington, near to the St Helens Road / Atherleigh Way junction, on the edge of Leigh town centre. The distance at over 2km of the site from the centre of population and Leigh town centre would result in a connecting bus journey being required for those without access to a car, in addition to further potential interchange being required in Manchester for some destinations, as already applies to many rail trips in the Greater Manchester area.

This study has investigated the viability of the above outline proposals alongside a number of other potential rail options. The testing of options has incorporate demand modelling and economic appraisal, alongside an assessment of the ability to deliver any such proposal (planning permissions, environmental constraints, funding etc). The assessment of rail proposals has taken into account the integration with future developments and other transport proposals such as the Leigh-Salford Manchester Guided Busway.

Figure 1.1: Leigh Study Area



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1.3 Study Scope

The focus of this study is a "High Level" strategic assessment of the options for development of rail services to serve the Leigh area.

Outputs from the study are recommendations for further action, if a decision is made to promote rail improvements in the Leigh area further, consistant with the core objectives below

- Policy Fit;
- Value for money and affordability; and
- Deliverability – planning, implementation, operation and funding.

A number of options of alignment and variants of supporting infrastructure have been considered. The project has sifted through these and developed a rationale for making specific recommendations about what's in and what's out of the final strategy. Sitting alongside such optioneering is the high level BCR to prove the overall value of the scheme, and an identification of specific show-stoppers that need further investigation if the project is to be progressed.

The approach adapted to completing this technical study is based on well established processes defined by key funding agencies in the UK, namely the Department for Transport (DfT) and Network Rail (NR).

The DfT and NR have produced extensive guidance on the development and appraisal of major transport schemes, as defined in WebTAG - website for Transport Appraisal Guidance, and GRIP – Governance to Rail Investment Projects and the approach to this study follows at a high level the core objectives as listed above.

1.4 Data and Information Used in the Study

This study has made use of the following sources of information:

- DfT's WebTAG and Network Rail GRIP guidance.
- Census 2001 Data (accessed via Neighbourhood Statistics)
- National Rail Travel Survey (supplied by DfT on behalf of Wigan Council)
- National Rail Timetables
- Office of Rail Regulation Patronage Data
- Wigan Congestion Study: GMTU Report 1639
- Wigan Core Strategy Transport Study: TfGM Highway Forecasting and Analytical Services Report 1672
- Wigan Draft Core Strategy Submission Version (September 2011)
- Warrington Borough Council Unitary Development Plan

1.5 Report Structure

The Report includes the following Chapters and supporting Appendices:

- Executive Summary
- Chapter 1 – Introduction
- Chapter 2 – Background Information
- Chapter 3 – Development of Options
- Chapter 4 – Option Costs
- Chapter 5 – Modelling of Options
- Chapter 6 – Economic Appraisal
- Chapter 7 – Funding and Delivery
- Chapter 8 – Benchmarking
- Chapter 9 – Conclusions and Recommendations

- Appendix A - Technical Note on Rail Operations
- Appendix B - Technical Note on Census Demand
- Appendix C - Technical Note on NRTS Data
- Appendix D – Cost Comparison
- Appendix E – Double Track Operations
- Appendix F – Detailed Cost Tables

2 Background Information

2.1 Introduction

This Chapter of the report includes a summary of the background information to the study and sets the scene on a number of key issues relating to current and proposed transport services in the Leigh Area, potential new development and land use changes in the area that could impact on the use of a rail service, and wider rail improvements as part of the Northern Hub Project.

2.2 Transport Provision

Up until the 1960s Leigh was located on a web of routes that connected it west on the Chat Moss route to Liverpool, north-west to Wigan, north-east to Bolton and east to Manchester. After the closure of these through routes Leigh was left without a rail service and located in a triangle bounded by the Chat Moss (Liverpool – Manchester) route to the south, the West Coast Main Line to the west and the Atherton corridor (linking Manchester and Wigan) to the north-east.

There has been substantial residential development around Leigh in recent years, which has led to increasing pressure on the local transport system. The problems associated with traffic congestion are proving difficult to address due to a high dependence on the private car, which has resulted from limited opportunities to access competitive public transport services, most notably to key employment destinations.

The current bus service provision from Leigh to Manchester along the main route is three buses per hour off peak, four buses in the evening peak and six buses in the morning peak, with other services also using part of the route. This journey currently takes approximately 60 minutes although the Leigh-Salford-Manchester Guided Busway could reduce this to 42 minutes.

The population of Leigh currently relies on stations outside of the immediate locality in order to access the rail network. The following list shows the rail stations that are most commonly used alongside a brief summary of the key facilities associated with each:

Electrification is planned for the Chat Moss route with mid-life electric trains being cascaded from south-east England. As well as being faster and quieter than existing diesel units, the electric trains will be 4 car formations, compared to the current 2 or 3 cars of a normal diesel multiple unit, giving an increase in capacity and allowing diesel units to be redeployed.

Table 2.1: Current Rail Stations in Leigh Area

Line and Station	Number Trains Per Hour to Key Centres			Station Parking Spaces and Charging	Bus Service passing Station to and from Leigh Area
	Manc	Warr	Liver		
Atherton Line					
Atherton	2	0	0	64, no charge	581 and 592 (each operating a 30 minute daytime service, although no services run beyond 1830). 582 operates every 10 minutes.
Daisy Hill	2	0	0	20, no charge	516 / 517 (each operating a 60 minute daytime service, whilst only the 516 via Chorley New Road operates in the evening – still at a 60 minute frequency)
ChatMoss Line					
Earlstown	2	2	2	None	34 (operates a 20 minute daytime service)
Newton-le-Willows	2	1	2	15, no charge	34 (operates a 20 minute daytime service)
Warrington Bank Quay	2	n/a	2	280 – £4 daily	19 (30 minute daytime service / 60 minute evening service), 28 / 28A (each operating a 60 minute daytime service, although only the 28A operates in the evening beyond 1930 – still at a 60 minute frequency)
CLC Line					
Birchwood	3	3	3	39, no charge	28 (operates a 60 minute daytime service, the service does not operate after 1900)
Glazebrook	2	2	2	5, no charge	No direct bus services to Leigh
Warrington Central	4	n/a	4	71 – £2.50 daily	19 (30 minute daytime service / 60 minute evening service), 28 / 28A (each operating a 60 minute daytime service, although only the 28A operates in the evening beyond 1930 – still at a 60 minute frequency)

2.3 Local Transport Policies and Strategies

This study has been commissioned to assess the opportunities to enhance rail travel within the Leigh area due to the potential that rail has to contribute to local objectives for the future.

At present, the Core Strategy for Wigan is being examined for soundness after it was submitted to the Secretary of State in September 2011. Accordingly, until the result of this examination is made clear it is not possible to state with certainty that the policies and objectives contained within the Core Strategy will remain unchanged. It is considered unlikely however that the essence of the Core Strategy Submission will see fundamental alteration, with this in mind it is summarised

below how enhancing rail provisions within the Leigh area will contribute to a selection of the objectives of the Core Strategy:

- **Community Development and Involvement** – vulnerable communities are likely to have improved access to a wider range of employment opportunities and support services. Increase in the attractiveness of Leigh for investment may lead to new developments.
- **Economy and Employment** – links to the key employment markets of Manchester, Liverpool and Warrington will be enhanced. These areas supply a range of skilled roles that are well paid. Connecting the Leigh area with such opportunities will increase its potential to retain / attract skilled employees who will in turn stimulate localised growth.
- **Retail and Centres** – Leigh's role as the main centre in the east of the Wigan Borough will be enhanced through increasing its potential to attract visitors from a wider catchment. This will support local businesses through increasing visitor numbers, as well as ensuring they arrive in a sustainable fashion, which will minimise the impacts of congestion.
- **Accessibility** – the proposed options will primarily improve accessibility by providing new options for rail travel, which will ensure people visiting Leigh or seeking to access the key employment centres of Manchester, Liverpool and Warrington from Leigh, have enhanced options available to them that do not rely on having access to a car. Wider benefits will occur as a result of minimising traffic congestion, alongside the improved infrastructure leading to additional investment in the local area.
- **Climate Change** – modal shift will be encouraged from the private car, which will reduce carbon emissions. Additional rail options will provide Leigh with the infrastructure that will allow future growth in a sustainable manner through promoting long-term behavioural change. Removing traffic from the local highway network will also ensure that carbon emissions resulting from congestion and the associated vehicle idling are minimised.

2.4 Northern Hub Improvements

The Northern Hub initiative plans to increase the capacity of the infrastructure in the Greater Manchester area, and along the Chat Moss line to Liverpool. A number of targeted infrastructure enhancements will increase overall capacity so that higher service frequencies can be obtained and capacity bottlenecks eased.

Trans-Pennine services between Manchester and Liverpool will be diverted on to the Chat Moss route from their existing route via Warrington Central on the CLC line. This eases congestion at Manchester Piccadilly, and to facilitate additional trains and accommodate the desired mix of fast and stopping trains a short four track section is to be created in the Huyton area towards Liverpool.

A key element affecting potential for Leigh services is the development of a new chord at Ordsall Lane in Manchester, which will allow trains to run directly from Piccadilly to Victoria stations via Salford Central , the latter including new platforms for services on the Chat Moss line. This also releases capacity at Piccadilly, and creates some additional opportunities.

It should be borne in mind however that the aim of Northern Hub is primarily to ease existing capacity constraints rather than create entirely new service axes or opportunities. Therefore, any new services, such as those envisaged for Leigh, will need to be able to fit neatly within the capacity created by Northern Hub.

2.5 Leigh Guided Busway

The proposed Leigh-Salford-Manchester Guided Busway will link Wigan, Leigh, Tyldesley, Ellenbrook, Salford and Manchester via a 21km route of segregated bus measures, of which 7km, between Leigh and Ellenbrook will be a kerb-guided busway. The scheme will also include park and ride facilities and would increase the frequency of daytime bus services to eight per hour on the main route between Tyldesley and Manchester City Centre (four buses per hour originating from Leigh and four buses per hour originating from Atherton).

At the Manchester end, the scheme would integrate with the proposed Cross City Bus Priority project. This scheme received funding approval in December 2011 when DfT announced its funding priorities from the Best and Final Funding Bid (BAFFB) process.

As part of the development of the Leigh-Salford-Manchester Guided Busway proposals, an independent review of rail and bus based alternative options for improved links between Leigh, Wigan and Manchester City Centre was undertaken by consultants.

It concluded that the Leigh-Salford-Manchester Guided Busway was the superior bus-based solution, offering rapid transit facilities at a relatively low-cost. The particular benefits are its reduction in bus-based journey times and its high penetration of Tyldesley and other areas between Leigh and Ellenbrook, which are not served by rail or express bus. Additional benefits are provided as a result of increased journey time reliability and the enhanced facilities for passengers.

The review also concluded that light rail or heavy rail options that had been suggested in previous studies, were not cost effective, with the majority having operational difficulties. At this time, it was suggested that further investigation should be conducted in relation to introducing a parkway station on the Liverpool-Manchester line at Kenyon Junction, it was stressed however that such an option did not represent an alternative to the busway in relation to Tyldesley and its surrounding areas.

2.6 Future Developments

Wigan Council and Warrington Borough Council were both approached in order to ascertain the details of any significant proposed developments within the study area.

In the case of Warrington Borough Council it was confirmed that there are no known development proposals that exceeded the relevant thresholds (developments over 1000sqm or 30 dwellings).

In contrast, Wigan Council identified a number of proposals within the study area that exceed the thresholds. Table 2.2 summarises the key features of these proposals.

Table 2.2: Future Developments within the Leigh Rail Study Area

Development Name and Location	Development Type	Site Area / Number of Units	Expected Implementation Date	Status of the Proposal
Leigh Sports Village, Atherleigh Way	D2 - Stadium, C3 - residential dwellings, B1 - Business units, A1 - retail food store and C1 - hotel.	Mixed use development comprising of 10,000 seat stadium, Wigan and Leigh College Sixth Form, Hotel, 145 dwellings, commercial space (3716m2), retail development, 400m running track, new pitches, club accommodation , 1160 car parking spaces and associated landscaping.	2010-2015	Approved. Stadium is opened plus part of residential commercial, educational, hotel and retail aspects are built.
Parsonage, Parsonage Way	A1 food retail store with associated car parking and landscaping.	8475sqm new food retail store adjacent to the existing Sainsbury's on Parsonage Way.	2010-2015	Resolution to grant subject to s106 agreement.
Tesco and Cinema (Spinning Jenny Way)	A1 food retail store with associated car parking and landscaping. D2 Cinema, A3 Restaurants.	A1 food retail store with associated car parking and landscaping, kiosk and petrol filling station. 7 screen cinema, 4 restaurant units.	2011	Now opened
Bickershaw Colliery Site, Plank Lane	C3 - 650 residential units, a maximum of 2750 square metres of commercial space (use classes A1, A2, A3, A4, A5 B1, D1, D2) principal highway infrastructure, a 40 berth canal basin, associated public realm and open space	Mixed use development comprising a maximum of 650 residential units, a maximum of 2750 square metres of commercial space (use classes A1, A2, A3, A4, A5 B1, D1, D2) principal highway infrastructure, a 40 berth canal basin, associated public realm and open space.	2010-2015	Approved, development commenced.
Bickershaw Colliery Site, Smiths Lane	D2 - outdoor recreational facility	Proposed Country Park including an 18 hole golf course, driving range, 9 hole pitch and putt course, outdoor activity centre including a lake, visitor centre, allotments, informal recreational facilities and ancillary facilities.	2010-2015	Approved.
Northleigh (Core Strategy Key Site)	B1,B2 & B8 (8ha) C3 44ha	Mixed use development site proposed delivering 44ha of residential development, of which 22ha will be delivered before 2018 with the remaining 22ha from 2018 to 2026. The employment uses will be delivered post 2018.	22ha residential 2011-2018 22ha residential post 2018 8ha employment post 2018	Pre-application.
East Lancashire Corridor (Broad Location in the Core Strategy)	C3 – residential	No exact numbers have been set as of yet, a rough ball part figure is in the region of 1200-1600 dwellings. The specific sites and number of dwellings will be determined in the Site Allocations DPD.	50% to be delivered before 2018.	Broad Location (Aspiration)

3 Development of Options

3.1 Introduction

A range of possible options for a rail service serving the Leigh Area have been considered based on the initial work completed by TfGM, plus work completed by other parties and from the wider proposals in the Northern Hub plan. The options have been sifted using a multi-criteria analysis (MCA) to reflect the benefits, costs, delivery and risk of each option, and a number of options were shortlisted for more detailed assessment within this study.

3.2 Range of Options

The options considered were defined in following categories:

- **Station Location in Pennington and Link to Main Line** – the location of the station in the Pennington area, with four locations considered, and a link to the Chat Moss line have been considered within options.

- **Service Pattern to / from Pennington** – for the preferred Pennington station and link, the service options to key centres of Manchester, Warrington and Liverpool were assessed to identify where it was possible to operate services to and from in each case, assuming a minimum hourly service, and preferred half-hourly service per direction.

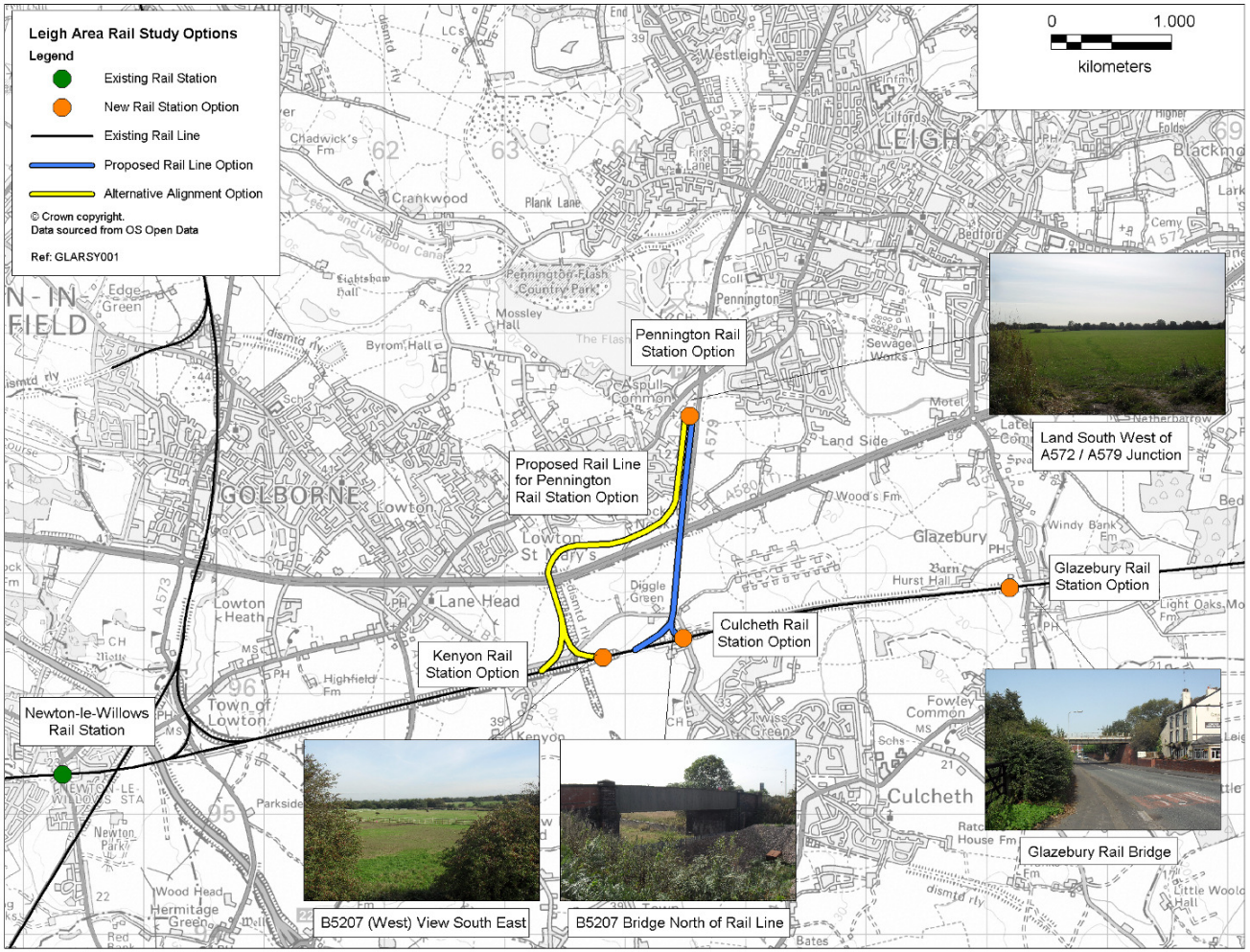
- **Shuttle Options on Pennington Spur** – the options of a shuttle service, using heavy rail, light rail (Parry People Mover) and bus were considered to link the Pennington area and Leigh Town Centre to new and existing rail stations on the Chat Moss line.

- **Stations on the Chat Moss Line** – options of a new rail station at Glazebrook, Culcheth, and Kenyon were considered, including changing baseline service patterns and adding new services.

- **Other Options** – these included alternative possible routes to getting a rail service to Leigh looking at other alignments and corridors to the proposed schemes in Pennington area.

Figure 3.1 indicates the location of these options.

Figure 3.1: Leigh Rail Study Options



Halcrow

3.3 Rail Operational Assessments

A number of operational schemes were considered at a high level using a Northern Hub timetable specification and draft timetable. This initial sift eliminated those that were clearly impractical due to obvious capacity constraints.

The remaining three options were considered in more detail; the timetable was examined for potential train path opportunities and indicative schedules created where possible. This informs the capital and operational costs in Chapter 4.

The full analysis can be found in Appendix A at the end of this report, the following sections give an overview of all the options considered.

Rejected Operational Schemes

Initial analysis based upon high level capacity analysis had concluded that theoretically there should be space for extra services and stops as the number of services on the line would not exceed 80% of the headway capacity.

The mix of services, however, provided in the draft timetable, i.e. fast and slow passenger services and freights, with their different sectional run times has divided this available capacity into discrete sections along the line, this rules out adding extra through services and inserting new stops into existing services is a non trivial exercise.

An additional constraint was that the existing twice hourly fast Manchester - Liverpool services and the hourly Manchester – Scotland service had specified departure times and journey time constraints and as such could not be moved or slowed by re-timing.

Additional Liverpool – Chat Moss station – Victoria services

Despite the four-tracking of the Huyton Junction to Roby section there is no contiguous spare capacity on the line between Liverpool and Victoria in the draft time table.

The four track section is used in the draft timetable to allow fast and semi-fast Liverpool – Manchester services to overtake slow Liverpool – Wigan and slow Liverpool – Manchester services and while there are gaps in this area they cannot be used as there is no connecting path through the Parkside – Victoria corridor.

Note: this may become viable if loops were provided at a Chat Moss station.

Additional Warrington Bank Quay – Chat Moss station – Victoria services

Whilst it is possible to join and leave the Chat Moss line at Earlestown. There is no space in the timetable to run a train all the way to or from Victoria.

Note: this may become viable if loops were provided at a Chat Moss station.

Developed Operational Schemes

Additional Pennington – Victoria Services

Contiguous space was identified between Victoria and Parkside Junction (exclusive) This meant that it was possible to add two tph per direction between

Victoria and a new Pennington station on a branch joining the Chat Moss line in the vicinity of Kenyon Junction.

The west bound paths come with a caveat however; it was necessary to assume that Chester bound services from Leeds could depart Victoria one minute earlier than scheduled in the draft timetable and that the following Leeds to Manchester Airport service could depart one minute later. Either of these assumptions may not be permissible in a wider context.

There is no platform capacity at Manchester Victoria in the existing platforms, 3 to 6, for these paths; even if the arriving train shunts to a different departure platform via a trip to Newton Heath TMD.

The draft timetable however identifies a platform 8, which is used by peak only originating / terminating services to / from Blackpool North only; if this platform was provided then the service could operate, but only once per hour in the peak. To fully realise 2 tph in the peak a further additional platform would be required and if this is not part of funded improvements to Victoria this would incur additional cost.

The paths identified are not favourably disposed to providing a convenient turn around at Pennington station; whilst the journey time was 21½ minutes west bound and 20 minutes on the return the round trip time for a unit, including the likely shunt via Newton Heath TMD, was in excess of one and a half hours, thus requiring four units for two trains per hour, instead of 2 of each if the turn around at each end could be minimised.

The lengthy layover at Pennington would require a two platform station however the branch and junction with the Chat Moss line could both be single track.

Additional Warrington Bank Quay – Pennington – Victoria services

Space for paths is available in the draft timetable, on the Chat Moss line, for two trains per hour per direction to travel between Earlestown Junction and a re-instated Kenyon Junction to access the branch. The two paths per hour per direction from the previous option would be re-used to provide access from Pennington to Victoria.

As for the additional Pennington – Victoria service this option can not be accommodated in the existing platforms at Victoria, even by shunting via Newton heath TMD; only if the putative platform 8 is provided can this service operate and only once per hour in the peak, 2 tph would require a further additional platform at Victoria and would incur an additional cost if this is not a part of planned station improvements.

The distribution of the paths makes operation of the branch very problematic. A roughly 30 minute layover at Pennington is required by services in the eastbound direction meaning that a through journey to Manchester is over one hour.

The long layovers and the likely need to shunt via Newton Heath TMD at Victoria, mean that a single unit can only make a departure from Victoria every three hours so that six units are needed to operate a 2 tph service.

Pennington station would require two platform faces whilst the branch itself would need to be double track to a point north of the Chat Moss line where it would split

into two single tracks connecting east facing Kenyon East Junction and west facing Kenyon West junction both on the Chat Moss line.

This option would not provide an attractive through service from Warrington to Manchester and makes bad use of resources. As before, more favourable paths would improve stock utilisation, make a more attractive through service and reduce the required level of infrastructure and associated costs.

Additional stop in existing Chat Moss services at a new Chat Moss station.

There are several services that can include a stop at a new station on the Chat Moss line. All of these options require re-timing of other trains, with impacts on journey times and interactions beyond the study area which would require further study to understand.

The only service that can accommodate a stop twice per hour in both directions are the slow Manchester Airport – Liverpool services. This is achievable without sacrificing other stops.

Other services can provide two stops per hour but only in one direction. As follows:

- West bound Chester services (with the loss of the stop at Newton-le-Willows)
- Eastbound semi fast Liverpool services (which contain a convenient pathing allowance which could be removed)

Next, these services could only accommodate a stop once per hour off peak, due to the hourly, constrained Manchester – Scotland service.

- Eastbound Chester services
- Westbound semi-fast Liverpool services

Finally the hourly peak Manchester – Preston service can itself accommodate a stop in both directions.

Impact on access to the proposed Port Salford development

It has been assumed that rail access to the complex would be via a branch joining the Chat Moss line via a flat, triangular junction midway between Eccles station and Astley signal box.

In this scenario none of the developed options has any negative impact on access to Port Salford.

Benefit of Loops at a Chat Moss line station

Loop platforms at the proposed Chat Moss line station would allow the partial paths found at each end of the Victoria – Parkside corridor to be joined up enabling additional through services between Victoria and Warrington, which would provide better eastbound journey times and stock utilisation than for the Victoria – Pennington – Warrington option.

If this infrastructure were assumed in future iterations of the Northern Hub timetable it would give more flexibility to the planners to possibly provide a more frequent service from Chat Moss to Manchester and elsewhere.

Recommendations

Given the above findings, the most feasible option would appear to be to provide stops at a Chat Moss station in existing slow Liverpool services draft time table services.

This would provide:

- Access to central Manchester if a stop can be incorporated at Oxford Road.
- Access to London services at Piccadilly
- Access to Liverpool and intermediate stops

There remain issues to be resolved, principally how well the eastbound service would fit onto the Deansgate – Piccadilly corridor and beyond. Also the acceptability of lengthening the journey time of eastbound Liverpool semi-fast services.

Loops should be provided at a Chat Moss station link up available paths at either end of the Victoria – Parkside corridor thus enabling additional trains to run between Victoria and Warrington Bank Quay, however this would probably require additional platform capacity at Victoria.

3.4 Sifting Framework

The MCA sifting framework is based on the following criteria:

- Strengths
- Weaknesses
- Opportunities
- Threats
- Deliverability
- Affordability
- Capital Costs
- Operating Costs
- Demand Shift
- Scheme Benefits

The scoring of the first six elements within the framework was a below:

- +++ Large Positive Score
- ++ Moderate Positive Score
- + Small Positive Score
- 0 Neutral
- --- Large Negative Score
- -- Moderate Negative Score
- - Small Negative Score
- X Potential Showstopper

The framework is reported in Table 3.1, including the scoring of the options using the criteria above.

The key points to be noted on each category of options are as below:

Station Location in Pennington and Link to Main Line – four locations were considered for the station in the Pennington area, within each quadrant of the junction of the A592 / A579. The two options to the north of the junction were seem as attracting most passenger demand as the catchments linked to the new development areas and were within possible walking distance of the town centre. However, the costs of the rail crossing the A579 St Helens Road, and the potential for environmental impacts and public objections were seem as major weaknesses to the options. Of the location south of the junction, the site south-west behind the fire station was seen as easier to access for rail as there was no need to cross the A572 and provided better highway access for park and ride trips. The south-west site is assumed as the station site in future appraisals in the report.

Service Pattern to / from Pennington – Analysis of existing travel demand data showed the need for the service to serve Manchester as the main destination. Options were considered looked at a service to Manchester Victoria, Oxford Road and Piccadilly stations. The latter two options were considered impossible due to capacity constraints under the Northern Hub timetabling. A service from Pennington to Victoria station is assumed as a core service in the option appraisals.

Service options to Warrington Bank Quay and Liverpool Lime were also considered, with the former destination identified as a major attractor of trips for people living the Leigh and Pennington area, many using a car to travel, due to poor public transport options. Access to Liverpool was seen as important to serve the areas west of the town and the Merseyside area for employment and business. Despite a number of operational constraints being highlighted in the sifting of options, a service to Warrington Bank Quay and Lime Street has been assumed in the options appraised, to see if there is a basic value for money case if such constraints could be overcome.

Shuttle Options on Pennington Spur –Service options with direct and shuttle services to key centres were considered, the latter due to constraints in the parts of the rail network make it difficult to increase the number of trains at critical points on the rail network. Such options linked to shuttle from Pennington station to a new station on the Chat Moss line and Newton-le-Willows and Patricroft as the existing stations either side of the Kenyon junction. Basic assessment of shuttle options showed low levels of passenger demand and benefit to be generated, due to the need to interchange between the shuttle service and the main heavy rail service. Given many passengers will have already accessed the Pennington station by car and bus, the shuttle with in effect result in three legs to a single journey (i.e. car / bus then two trains). Such travel behaviour is not common, especially for commuting and business trips, where simple trips are preferred, with one rail leg and walk access at one of the trip if not both ends. The option of a light rail system, similar to a Parry People Mover, has been assumed for the appraisal of a shuttle option, with the service running through to Leigh Town Centre to the south of A579 King Street junction.

Stations on the Chat Moss Line – Three locations for new stops were considered, close to Glazebury, Culcheth and Kenyon. The location at Glazebury offered the highest demand and immediate catchment, plus it is served by existing bus

services. It also provided shorter and more direct connectivity to the south Leigh area. The other two sites are isolated from existing developments, hence are very heavily dependant on car or bus for access. Neither is currently served by bus, hence additional shuttle services would be required to provide access for non-car users. All sites have planning issues and are within the greenbelt. In terms of rail costs and operations, there is little difference between options given the spacing from existing stations and topography. For the appraisal option, sites at Kenyon and Glazebury have been assessed. The former includes bus shuttle services to the site, and a new link road from the A580 East Lancashire Road from the junction of A572 Atherleigh Way to the station site. This scheme will greatly improve access for park and ride trips and increase the catchment potential of the proposed station.

Other Options – other options considered looked at different rail alignments into the Leigh area from the east of the town and linking to the Atherton Line. The options were seen as considerably more expensive than the Pennington options and would not offer the same flexibility in service patterns to centres such as Warrington and Liverpool. Further, the costs of these other options and the risk to delivery were seen as significantly higher than the Pennington and Chat Moss Station options. Hence no other options were taken forward for more detailed appraisal.

Table 3.1 – Results of MCA: Station Location in Pennington and Link to Main Line

Key	+++	Large Positive Score	++	Moderate Positive Score	+	Small Positive Score	0	Neutral
	---	Large Negative Score	--	Moderate Negative Score	-	Small Negative Score	X	Potential Showstopper

Ref	Scheme	Description	Key Features	Strengths	Weaknesses	Opportunities	Threats	Deliverability	Affordability	Capital Costs	Operating Costs	Demand including Mode Shift	Benefits
Station Location in Pennington and Link to Main Line													
1.1	Pennington Station Location	North East of A579 / A572	Location of station to the north of the Sports Village and the south of the Leeds and Liverpool Canal.	Appears to be space for a car park and station, but major development plans in area so land may not be available.	Alignment north of junction is restricted due to Sports Village access, area is greenbelt. Need for major infrastructure to cross A572.	Closer to the town centre and walkable to most areas of Leigh. Also close to Sports Village and new developments. Large parking area at Stadium that could be used for Park and Ride.	Congestion issues at A579 junction. Route will compete with busway for trips to Manchester.	Longest Spur, need to cross A572, will be many planning.	Highest Cost Scheme in terms of Capital and Operating Costs	High	High	High	Medium
	TfGM Options 1A+1B			0	--	++	--	---	--				
1.2	Pennington Station Location	North West of A579 / A572	Location of station to the east of The Flash and the south of the Leeds and Liverpool Canal.	Limited to be space for a car park and station, but area of SSSI.	Location for the station is difficult due to access road for The Flash and woodland. Area is SSSI. Need to cross the A572 at grade or with major infrastructure.	Closer to the town centre and walkable to most areas of Leigh. Also close to Sports Village and new developments.	Major environmental Impacts. Also close to golf course. Competes with trips for the busway. Public opposition to loss of public open space.	Longest Spur, need to cross A572, likely to be many planning and objections. SSSI make showstopper	Highest Cost Scheme in terms of Capital and Operating Costs	High	High	High	Medium
	TfGM Options 1A+1B			-	--	++	--	X	--				
1.3	Pennington Station Location	South West of A579 / A572	Location to the south of the junction and south of the Fire Station.	Does not cross the A572, Less visible to local residents.	Further location from Leigh Town Centre, will not attract trips, need for bus shuttle service to serve the centre. Greenbelt most areas.	Access to car park from existing point adjacent to Robin Hood pub, with land available. Closest to Aspull and Lowton Common for walk access	Alignment is very close to housing area in Lowton Common - issues of noise and possible compensation. Congestion at A579 / A572 junction.	Less infrastructure but issues of alignment close to housing, planning and compensation issues. Many planning issues	High Cost Scheme in terms of Capital and Operating Costs	Medium	Medium	Medium	Medium
	TfGM Options 1A+1B			+	-	+	--	--	-				
1.4	Pennington Station Location	South East of A579 / A572	Location to the south of the junction is open space between residential area and the A579	Lots of space for station and car park. Very visible from highway.	Access to site is not easy. New junction would be required on the A579 or on the A572 close to the junction. Access via residential areas is not possible or desirable. All greenbelt area. Need for rail link to cross A579.	Much space for interchange, bus service and interchange.	Very visible to many local residents. Need to cross the A579 so additional infrastructure required. Congestion at A579 / A572 junction.	Long Spur, need to cross A579, will be many planning.	High Cost Scheme in terms of Capital and Operating Costs	High	Medium	Low	Medium
	TfGM Options 1A+1B			+	--	+	--	--	-				

Table 3.1 - Results of MCA: Service Pattern to / from Pennington

Key	+++	Large Positive Score	++	Moderate Positive Score	+	Small Positive Score	0	Neutral
	---	Large Negative Score	--	Moderate Negative Score	-	Small Negative Score	X	Potential Showstopper

Ref	Scheme	Description	Key Features	Strengths	Weaknesses	Opportunities	Threats	Deliverability	Affordability	Capital Costs	Operating Costs	Demand including Mode Shift	Benefits
Service Pattern to / from Pennington													
2.1	Additional heavy rail trains from Manchester Victoria to new line and station at Pennington	~2 1/2 miles branch joining the Chat Moss line north of Culcheth. Train services run between Manchester Victoria and Pennington.	Manchester facing, single lead Junction on the Chat Moss line. The single track branch would only require one platform at Pennington. Signalling could be limited to entrance /exit from/to the main line. Electrification may not be required depending on units chosen to operate service. Branch: 4.5 minutes. Total journey time 25.5 minutes. Out and back time: 56 minutes. Round trip time: 61 minutes. Minimum time on branch: 14 minutes. Complete single track branch can support 4 tph. Out and back time unlikely to be coverable by a diagram turning around at Manchester, therefore an extra unit would be required.	One stage journey to Manchester Fast journey time 25.5 minutes. Uses same corridor as busy road. Very visible The single track branch would only require one platform at Pennington. Signalling could be limited to entrance /exit from/to the main line. Electrification may not be required depending on units chosen to operate service.	Requires 'rail side' infrastructure. Manchester facing, single lead Junction on the Chat Moss line - potential capacity constrainer. Given the out and back time it is unlikely that an existing diagram could be extended to cover this service. Additional rolling stock required.	Victoria serves many job, shopping and leisure areas in the City Centre all within easy walking distance	Could undermine viability of planned busway, as many common destinations on the Salford Central and north City Centre areas.	No issue beyond those identified as part of the spur and station at Pennington.	Likely to generate revenue closest to the operating costs, hence lowest level of subsidy required.	**Medium**	**Medium**	**High / Medium**	**Medium**
				+	-	++	-	+	-				
2.2	Additional trains from Manchester Piccadilly to new line and station at Pennington	~2 1/2 miles branch joining the Chat Moss line north of Culcheth. Train services run between Manchester Piccadilly and Pennington.	Manchester facing, single lead Junction on the Chat Moss line. The single track branch would only require one platform at Pennington. Signalling could be limited to entrance /exit from/to the main line. Electrification may not be required depending on units chosen to operate service. Branch: 4.5 minutes Total journey time 22.5 minutes Out and back time: 50 minutes Round trip time: 55 minutes Minimum time on branch: 14 minutes Complete single track branch can support 4 tph Out and back time unlikely to be coverable by a diagram turning around at Manchester, therefore an extra unit would be required.	One stage journey to Manchester Fast journey time 22.5 minutes. Uses same corridor as busy road. Very visible The single track branch would only require one platform at Pennington. Signalling could be limited to entrance /exit from/to the main line. Electrification may not be required depending on units chosen to operate service.	Requires 'rail side' infrastructure. Manchester facing, single lead Junction on the Chat Moss line - potential capacity constrainer. Given the out and back time it is unlikely that an existing diagram could be extended to cover this service. Additional rolling stock required.	New services could extend or be linked to existing services to Manchester Airport. Interchange to all major services to regional and national level	Could undermine viability of planned busway. Unable to turn back at Piccadilly through platforms	Issue of access and turnback at Piccadilly may prevent the service.	Likely to generate revenue closest to the operating costs, hence lowest level of subsidy required.	**Medium**	**Medium**	**High**	**Medium**
				+	-	++	--	0	-				
2.3	Additional trains from Manchester Oxford Road to new line and station at Pennington	~2 1/2 miles branch joining the Chat Moss line north of Culcheth. Train services run between Manchester Piccadilly and Pennington.	Manchester facing, single lead Junction on the Chat Moss line. The single track branch would only require one platform at Pennington. Signalling could be limited to entrance /exit from/to the main line. Electrification may not be required depending on units chosen to operate service. Total journey time 20.5 minutes Out and back time: 46 minutes Round trip time: 51 minutes Minimum time on branch: 14 minutes Complete single track branch can support 4 tph Out and back time unlikely to be coverable by a diagram turning around at Manchester, therefore an extra unit would be required.	One stage journey to Manchester Fast journey time 20.5 minutes. Uses same corridor as busy road. Very visible The single track branch would only require one platform at Pennington. Signalling could be limited to entrance /exit from/to the main line. Electrification may not be required depending on units chosen to operate service.	Requires 'rail side' infrastructure. Manchester facing, single lead Junction on the Chat Moss line - potential capacity constrainer. Given the out and back time it is unlikely that an existing diagram could be extended to cover this service. Additional rolling stock required. Turnback opportunity at Oxford Road may be limited depending on other services.	None	Could undermine viability of planned busway.	No issue beyond those identified as part of the spur and station at Pennington.	Gap between revenue and costs is largest of three station destinations considered. No scope to add to existing service and incurr marginal costs.	**Medium**	**Medium**	**Medium**	**Low**
				+	-	0	--	+	--				
2.4	Through Chat Moss services to divert via the new line to Pennington and reverse to continue their journey.	~2 1/2 miles branch joining the Chat Moss line north of Culcheth. Train services run between Manchester Victoria and proposed destinations diverting to Leigh where they reverse.	Minimum of a triangular single lead Junction on the Chat Moss line. Minimum of one platform at Pennington . Minimum of single track branch. Full signalling required as more than one train may be on the branch at once Electrification may not be required depending on units chosen to operate service. Total journey time to Victoria 25.5 minutes Journey time extension to through services: 14 minutes.	Serves Liverpool and Manchester One stage journey to each Fast journey time 25.5 minutes. Uses same corridor as busy road. Very visible Electrification may not be required depending on units chosen to operate service.	Requires greater amount of 'rail side' infrastructure, i.e. triangular junction on the Chat Moss line, and may need more than a single lead junction and partial/full doubling of branch. Due to trains running in both east and west 1 tph may require some double tracking of the branch, and this is more likely for 2 trains per hour. Journey time impact on through services diverted via Pennington: 14 minutes. It is likely that the journey time impact will require extra units.	Provides direct service to Manchester and Liverpool centres, and intermediate stations.	TOC's may object to journey time extension. Slower train may not fit in with timetable elsewhere. Potential major loss of existing passengers and revenue due to longer travel times for through passengers.	Issues with TOC's is a major issue on delivery.	Likely that loss in revenue for existing passengers will exceed new revenue, hence operator is incurring more cost for less revenue - need for more subsidy.	**High**	**High**	**Low**	**Net Disbenefit**
				++	--	++	--	-	--				

Table 3.1 - Results of MCA: Shuttle Options on Pennington Spur

Key	+++	Large Positive Score	++	Moderate Positive Score	+	Small Positive Score	0	Neutral
	---	Large Negative Score	--	Moderate Negative Score	-	Small Negative Score	X	Potential Showstopper

Ref	Scheme	Description	Key Features	Strengths	Weaknesses	Opportunities	Threats	Deliverability	Affordability	Capital Costs	Operating Costs	Demand including Mode Shift	Benefits
Shuttle Options on Pennington Spur													
3.1	Pennington - Chat Moss interchange station shuttle service using conventional train	~2 1/2 miles branch between Pennington and an interchange station on the Chat Moss line north of Culcheth. A shuttle service to be provided on the branch to connect with main line calls.	Single lead Junction on the Chat Moss line. The single track branch would only require one platform at Pennington. 3 platform interchange station to keep normal branch operation from fouling the main line. Signalling could be limited to entrance /exit from/to the main line. Electrification may not be required depending on units chosen to operate service. Pennington to Interchange 4.5 minutes Interchange to Victoria 20.5 minutes. Total journey time 30 minutes (including connection allowance) Out and back time: 14 minutes Round trip time: 19 minutes Complete single track branch can support 3 tph A mainline connection would be required to let the unit run to a depot for servicing. If one unit is used only the entrance/exit of the branch needs to be signalled.	Uses same corridor as busy road. Very visible The single track branch would only require one platform at Pennington. Signalling could be limited to entrance /exit from/to the main line. Electrification may not be required depending on units chosen to operate service. Serves Manchester and Liverpool Fast journey time: 30 minutes	Rail side' infrastructure required. Interchange station required, users may find this off putting Two stage rail journey - not popular for commuters. Additional unit required just for the shuttle. Connecting calls will be required in through services, extending their journey times	Manchester facing, single lead Junction on the Chat Moss line, would give future through service opportunities.	TOC's may object to journey time extension of main line trains.	Delivery issues highlighted in Section 1 for Pennington Station and Spur. Need for new station on Chat Moss Line.	Still incurr high capital costs, but reduced operating costs.	High	Medium	Low	Low
				+	--	+	-	-	--				
3.2	Pennington - Patricroft shuttle service using conventional train	~2 1/2 miles branch joining the Chat Moss line north of Culcheth. A shuttle service runs between Pennington and Patricroft. Where they connect with through services.	Minimum of single lead Junction on the Chat Moss line. Minimum of a single track branch. Minimum of one platform at Pennington Signalling could be limited to entrance /exit from/to the main line. Electrification may not be required depending on units chosen to operate service. Time on branch: 14 minutes, single track can support 4 tph Pennington to Patricroft 12.5 minutes Patricroft to Victoria 13 minutes. Total journey time 30.5 minutes (including connection allowance) Out and back time: 30 minutes Round trip time: 35 minutes 2 units required for 2 tph. Would require off line reversal facilities at Patricroft.	Uses same corridor as busy road. Very visible The single track branch would only require one platform at Pennington. Signalling could be limited to entrance /exit from/to the main line. Electrification may not be required depending on units chosen to operate service. Serves Manchester and Liverpool. No new station on Chat Moss.	Rail side' infrastructure required. Two stage rail journey. Additional unit required Manchester facing, single lead Junction on the Chat Moss line. Additional infrastructure at Patricroft Borderline Fast Manchester journey time:30'30 Takes up additional Chat Moss line capacity without the advantage of eliminating the need to change trains 2 units required for 2 tph. May require more than a simple single track branch.	Scope to increase services at Patricroft so benefit local people.	TOC's may object to journey time extension of main line trains. Need to stop more services at Patricroft to improve interchange with Shuttle.	Delivery issues highlighted in Section 1 for Pennington Station and Spur. No new new station on Chat Moss Line.	Still incurr high capital costs, but reduced operating costs - with no costs for new station	Medium	High / Medium	Very Low	Very Low
				+	--	+	--	-	-				
3.3	Pennington - Newton-le-Willows shuttle service using conventional train	~2 1/2 miles branch joining the Chat Moss line north of Culcheth. A shuttle service runs between Pennington and Newton-le-Willows. Where they connect with through services.	Minimum of single lead Junction on the Chat Moss line. Minimum of a single track branch. Minimum of one platform at Pennington Signalling could be limited to entrance /exit from/to the main line. Electrification may not be required depending on units chosen to operate service. Time on branch: 14 minutes, single track can support max 4 tph Pennington to Newton-le-Willows 8.5 minutes Newton-le-Willows to Victoria 21 minutes. Total journey time 34.5 minutes (including connection allowance) Out and back time: 22 minutes Round trip time: 27minutes 2 units required for 1 tph. Would require off line reversal facilities at Newton-le-Willows.	Uses same corridor as busy road. Very visible. The single track branch would only require one platform at Pennington. Signalling could be limited to entrance /exit from/to the main line. Electrification may not be required depending on units chosen to operate service. Serves Manchester and Liverpool. No new station on Chat Moss.	Rail side' infrastructure required. Two stage rail journey. Additional unit required Liverpool facing, single lead Junction on the Chat Moss line. Additional infrastructure at Patricroft Longer journey time of 34'30 Takes up additional Chat Moss line capacity without the advantage of eliminating the need to change trains Junction facing wrong way for future Manchester through service. Few connecting services at Patricroft.	Extension of service to Liverpool and Warrington	Junction facing wrong way for future Manchester through service	Delivery issues highlighted in Section 1 for Pennington Station and Spur. No new new station on Chat Moss Line.	Still incurr high capital costs, but reduced operating costs - with no costs for new station	Medium	High / Medium	Low	Low
				+	--	0	-	-	-				
3.4	Pennington - Chat Moss interchange station shuttle service using Parry People Mover	~2 1/2 miles branch between Pennington and an interchange station on the Chat Moss line north of Culcheth. A shuttle service to be provided on the branch utilising emerging ultra-light rail technology to reduce costs.	No connection to the Chat Moss line. ~2.5 mile Single track branch. 1 platform at Pennington. 3 platform interchange station. Signalling not required. Electrification not required. Pennington to Interchange 4.5 minutes. Interchange to Victoria 20.5 minutes. Total journey time 30 minutes (including connection allowance). Out and back time: 11 minutes. Round trip time: 13 minutes. Complete single track branch can support 4 tph.	Cheaper capital and operating costs than heavy rail. Definitely no electrification required. Fast journey time: 30 Innovative No mainline connection required. Local jobs for maintenance and driving. More services at Newton.	Rail side' infrastructure required, including stabling and maintenance Two stage rail journey. Additional unit required Slightly extended journey times for existing through services to enable connection Backward journey for Manchester bound trips.	On street running a possibility in Leigh town centre. High frequency service, reduces interchange penalty.	Image problem a possibility. No prospect of future through Manchester services.	Delivery issue on technology.	Much lower capital and operating costs than heavy rail.	Low	Low	Low	Low
				++	--	+	--	+	0				
3.5	Pennington - Patricroft shuttle service using Parry People Mover	~10 mile branch between Pennington and Patricroft, paralleling the Chat Moss from north of Culcheth. Trains will shuttle between Pennington and Patricroft.	No connection to the Chat Moss line. ~10 mile single track branch with passing loop. 1 platform at Pennington. 1 platform Interchange at or near Patricroft Station. Signalling not required. Electrification not required. Pennington to Patricroft 15.5 minutes. Patricroft to Victoria 13 minutes. Total journey time 33.5 minutes (including connection allowance). Out and back time: 33 minutes. Round trip time: 35 minutes.	Cheaper capital and operating costs than heavy rail. Definitely no electrification required. Innovative Local jobs for maintenance and driving.	Rail side' infrastructure required. Two stage journey 2 units required for 2 trains per hour	On street running a possibility in Leigh town centre. High frequency service, reduces interchange penalty.	PPM not permitted on mixed traffic infrastructure.	Delivery issue on technology and links / sharing with heavy rail.	Much lower capital and operating costs than heavy rail.	Medium	Low	Very Low	Very Low
				++	--	+	--	0	0				
3.6	Pennington - Newton-le-Willows shuttle service using Parry People Mover		No connection to the Chat Moss line. ~10 mile single track branch with passing loop. 1 platform at Pennington. 1 platform Interchange at or near Patricroft Station. Signalling not required. Electrification not required. Pennington to Newton-le-Willows 9 minutes. Newton-le-Willows to Victoria 21 minutes. Total journey time 35 minutes (including connection allowance). Out and back time: 20 minutes. Round trip time: 22 minutes. 1 unit required for 2 tph.	Cheaper capital and operating costs than heavy rail. Definitely no electrification required. Innovative Local jobs for maintenance and driving.	Rail side' infrastructure required. Two stage journey Additional unit required Liverpool facing, single lead Junction on the Chat Moss line.	On street running a possibility in Leigh town centre. High frequency service, reduces interchange penalty.	PPM not permitted on mixed traffic infrastructure.	Delivery issue on technology and links / sharing with heavy rail.	Much lower capital and operating costs than heavy rail.	Medium	Low	Low	Low
				++	--	+	--	0	0				

Table 3.1 - Results of MCA: Stations on the Chat Moss Line

Ref	Scheme	Description	Key Features	Strengths	Weaknesses	Opportunities	Threats	Deliverability	Affordability	Capital Costs	Operating Costs	Demand including Mode Shift	Benefits
Stations on the Chat Moss Line													
4.1	Additional calls in pre-existing services along Chat Moss line to the south of Leigh. Station north of Culcheth. **TfGM Options 2A+2B**	New station on the Chat Moss Line, north of Culcheth	Platform faces on up and down Chat Moss lines Culcheth to Victoria: 18.5 minutes. Journey time impact to through trains 1 min 45secs Additional stops could be covered by the same diagrams negating the need for an extra unit.	Minimal infrastructure required in form of 2 platforms, on the Chat Moss. Potentially no extra units required. One stage journey to Manchester Fast rail journey time to Manchester: 18.5 mins. Serves Liverpool and Manchester **++**	Journey time impact to through trains. Station is not close to population and drive routes are direction from north. Station in Warrington Borough. **--**	Park and ride service to Leigh - more direct access via A574 Case for station could be bolstered by including Warrington area traffic and sourcing Park and Ride business from the East Lancs Road. Possible transfer of demand from Glazebrook area. **+**	TOC's may object to journey time extension. Slower train may not fit in with time table elsewhere. **--**	Infrastructure is only station. Fewest planning issues. Need to find adjsuted path to fit into network. **++**	Lowest capital and operating costs. Concern is the level of new demand generated and the possible loss of through passenger revenue. **+**	**Low**	**Very low**	**Low**	**Low**
4.2	Additional calls in pre-existing services along Chat Moss line to the south of Leigh. Station at Glazebury **TfGM Option 3**	New station on the Chat Moss Line, south of Glazebury	Platform faces on up and down Chat Moss lines Culcheth to Victoria: 20.5 minutes. Journey time impact to through trains 1 min 45secs Additional stops could be covered by the same diagrams negating the need for an extra unit.	Minimal infrastructure required in form of 2 platforms, on the Chat Moss. Potentially no extra units required. One stage journey to Manchester Fast rail journey time to Manchester: 20.5. Serves Liverpool and Manchester. **++**	Journey time impact to through trains. Station not in population centre. Station in Warrington Borough Leigh road traffic to station would have to pass through Glazebury village. Green belt area. **-**	Park and ride service to Leigh. Existing buses pass the site. Case for station could be bolstered by including Warrington area traffic and sourcing Park and Ride business from the East Lancs Road. **++**	TOC's may object to journey time extension Slower train may not fit in with time table elsewhere. **--**	Infrastructure is only station. Fewest planning issues. Need to find adjsuted path to fit into network. **++**	Lowest capital and operating costs. Concern is the level of new demand generated and the possible loss of through passenger revenue. **+**	**Low**	**Very low**	**Medium**	**Low**
4.3	Additional calls in pre-existing services along Chat Moss line to the south of Leigh. Site close to Kenyon. **TfGM Option 1B**	New station on the Chat Moss Line, to the east of Kenyon.	Platform faces on up and down Chat Moss lines Journey time to Victoria: Journey time impact to through trains 1 min 45sec Additional stops could be covered by the same diagrams negating the need for an extra unit.	Minimal infrastructure required in form of 2 platforms, on the Chat Moss. Potentially no extra units required. One stage journey to Manchester Fast rail journey time to Manchester: not known Serves Liverpool and Manchester **++**	Journey time impact to through trains. Station not in population centre. Station will be in Warrington Borough. Station would need to be close to Kenyon so avoiding spur junction, Area is greenbelt. **--**	Park and ride service to Leigh but drive routes not direct. No bus service pass site - need for shuttle service Case for station could be bolstered by including Birchwood, Croft, Warrington area traffic. Also links to developments in Lowton / Aspull area. **+**	TOC's may object to journey time extension. Slower train may not fit in with time table elsewhere. **--**	Infrastructure is only station. Fewest planning issues. Need to find adjsuted path to fit into network. **++**	Lowest capital and operating costs. Concern is the level of new demand generated and the possible loss of through passenger revenue. **+**	**Low**	**Very low**	**Low**	**Low**
4.4	Additional trains from Manchester Victoria to a new station on the Chat Moss Line to be determined - select best performing station option of three above	As *Chat Moss Culcheth* or *Chat Moss Glazebury*. *Services either terminate here from Victoria or continue onwards.*	Platform on either up or down Chat Moss, or a bay platform. Crossover to allow trains to reverse Associated Signalling for train reversal Culcheth to Victoria: 20.5 minutes Glazebury to Victoria: 18.5 minutes	Station could serves Liverpool and Manchester. Minimal infrastructure needed for through trains i.e. 2 platforms. Fast rail journey time to Victoria: 20.5 or 18.5 minutes **++**	Extra infrastructure required for terminating trains, possibly including a new bay platform. Turnback movements would take up additional capacity. Additional trains would not serve Liverpool, and if through trains do call, there is no real need for terminating services. Additional Units required. **--**	New services could extend beyond Manchester Park and ride service to catchments north and south of the stations. **+**	Station would be in Warrington **0**	Infrastructure is only station. Fewest planning issues. Need to find new path to fit into network. **+**	Low capital and but new operating costs. Concern is the level of new demand generated to cover operating costs. **0**	**Low**	**Medium**	**Low**	**Low**
4.5	Additional trains from Manchester Piccadilly to a new station on the Chat Moss Line to be determined (2)	As *Chat Moss New Stn 1 for Victoria read Piccadilly*	Platform on either up or down Chat Moss, or a bay platform. Crossover to allow trains to reverse Associated Signalling for train reversal Culcheth to Piccadilly: 19 minutes Glazebury to Piccadilly 17 minutes	Station could serves Liverpool and Manchester. Minimal infrastructure needed for through trains i.e. 2 platforms. Fast rail journey time to Piccadilly 19 or 17 minutes **++**	Extra infrastructure required for terminating trains, possibly including a new bay platform Turnback movements would take up additional capacity Additional trains would not serve Liverpool, and if through trains do call, there is no real need for terminating services. Additional Units required. **--**	New services could extend beyond Manchester, interchange to wider range of services regionally and nationally. Park and ride for wider area catchment north and south of the station. **++**	Station would be in Warrington Unable to turn back at Piccadilly through platforms **-**	Infrastructure is only station. Fewest planning issues. Need to find new path to fit into network. **+**	Low capital and but new operating costs. Concern is the level of new demand generated to cover operating costs. **0**	**Low**	**Medium**	**Low**	**Low**

Table 3.1 - Results of MCA: Other Options

Key	+++	Large Positive Score	++	Moderate Positive Score	+	Small Positive Score	0	Neutral
	---	Large Negative Score	--	Moderate Negative Score	-	Small Negative Score	X	Potential Showstopper

Ref	Scheme	Description	Key Features	Strengths	Weaknesses	Opportunities	Threats	Deliverability	Affordability	Capital Costs	Operating Costs	Demand including Mode Shift	Benefits
Other Options													
5.1	Busway via Moorside	Train service alongside busway alignment from former Leigh Goods station site, diverging north alongside M60 to join the Atherton line into Manchester around Moorside station.	Manchester facing junction on the Atherton Line 0.5 miles west of Moorside. ~7 mile branch. Some doubling probably required. Full signalling required due to more than one train on branch. Electrification may not be required. Leigh to Junction 11 minutes. Time on branch 27 minutes. Single track branch supports max 2 trains per hour. Leigh to Moorside 12 minutes. Moorside to Victoria is 20 minutes . Total journey time is 32 minutes. Round trip time 74 minutes. 3 units for 2 tph.	Uses old railway alignment towards Manchester. Station would be centrally located in Leigh. Possible station site at Tyldesley.	Substantial 'Rail side' infrastructure required. Some double track required. Possibly insufficient capacity via the Atherton Line.	Integration with busway resulting in more demand and higher benefits.	Extensive earthworks required to cross the motorway Not enough space next to busway. May more heavily abstract from the busway than other options. Compete with the busway for trips to the regional centre.	Many issues for new alignment. Difficult to deliver in the town centre. May not fit with bus way alignment.	Extremely expense option, high capital costs - many new strcutures and new track. Operating costs could be minimised if services diverted from Chat Moss line, but longer end to end travel time for through passengers is likely to result.	**Very High**	**High / Medium**	**Medium**	**Medium**
				--	--	+	--	---	-				
5.2	Busway via Eccles	Train service along busway alignment from former Leigh Goods station site along original alignment to Eccles station.	Manchester facing junction on the Chat Moss Line 0.25 miles west of Eccles. ~8 mile branch. Some doubling probably required. Full signalling required for likely hood of more than one train on branch. Electrification may not be required. Leigh to Junction 12.5minutes. Time on branch 30 minutes. Single track branch supports max 2 trains per hour. Leigh to Eccles 13 minutes. Eccles to Victoria is 13 minutes . Total journey time is 36 minutes. Round trip time 82 minutes. 3 units for 2 tph.	Uses old railway alignment towards Manchester. Station would be centrally located in Leigh. Possible station site at Tyldesley.	Substantial 'Rail side' infrastructure required. Tunnelling or extensive demolition required in Worsley and Eccles.	Integration with busway resulting in more demand and higher benefits.	Demolition possibly required in Worsley Eccles is unlikely to be acceptable. Not enough space next to busway without acquisition of more land. Very likely to more heavily abstract from the busway than other options.	Many issues for new alignment. Difficult to deliver in the town centre. May not fit with bus way alignment.	Extremely expense option, high capital costs - many new strcutures and new track. Operating costs could be minimised if services diverted from Chat Moss line, but longer end to end travel time for through passengers is likely to result.	**Very High**	**High / Medium**	**Medium**	**Medium**
				--	--	+	--	---	-				

3.5 Demand Analysis

Travel demand within the Leigh catchment has been assessed using the following two datasets:

- Census 2001: Journey to Work Dataset
- National Rail Travel Survey (NRTS) for 2006/07.

Census 2001: Journey to Work Dataset

Only the key findings of this analysis are presented within this report, Appendix B should be referred to for further details.

The number of people living within a likely catchment of each of the new station options has been estimated from census data, plus how many of these people work within the likely catchment of a destination station that could be served by service from a station in the Leigh area.

The analysis has demonstrated that there are a low number of trips in the journey to work data from the Leigh study area to a destination which may be served by a future rail service. Particularly, there are very few rail trips, which is perhaps understandable given that Leigh does not currently have a rail station and therefore using rail would require an interchange journey to another station outside of the town.

Additionally, the levels of people living within a typical walking catchment (assumed to be 1km in this analysis) of the proposed options are very low and emphasise the need for provision of either park & ride or public transport interchange.

Table 3.2 demonstrates the population within the Leigh study area in terms of

- Working within the potential catchment of a served rail station outside of the Leigh study area (Destination: Catchment)
- Working within the Leigh study area (Destination: Leigh)
- All work trips (Destination: All).

The total number of journey to work trips from the Leigh study area to possible stations served is fairly low in comparison to the overall numbers of journey to work trips. The proportion is 7.6% (2,795 people). A total of 45.1% (16,506 people) of journey to work trips are internal to the Leigh study area and are unlikely to use a new station at Leigh in anything more than small numbers. The remaining 17,328 people work in areas that are unlikely to be served by a new rail station at Leigh.

Table 3.2: Comparison of Leigh Journey to Work Trip Destinations (Journeys to Work per Day)

Origin	Destination	Total	Train / bus	Car - Driver / Pax	Cycle Walk	Other	Origin
Leigh	Catchment	2,795	489	2,237	24	45	Leigh
Leigh	Leigh	16,506	1122	8,430	3907	3,047	Leigh
Leigh	All	36,629	2820	25,886	4543	3,380	Leigh

The mode share of car relative to public transport to various wards served by a potential station in Leigh is summarised in Figures 3.2 – 3.3. Figure 3.2 demonstrates the absolute values of car and public transport numbers of journeys to work, whereas Figure 3.3 provides the percentage splits of car and public transport journeys to work.

Figure 3.2: Absolute Trips from Leigh Study Area to Destinations Potentially Served by Rail (Journeys to Work by Ward)

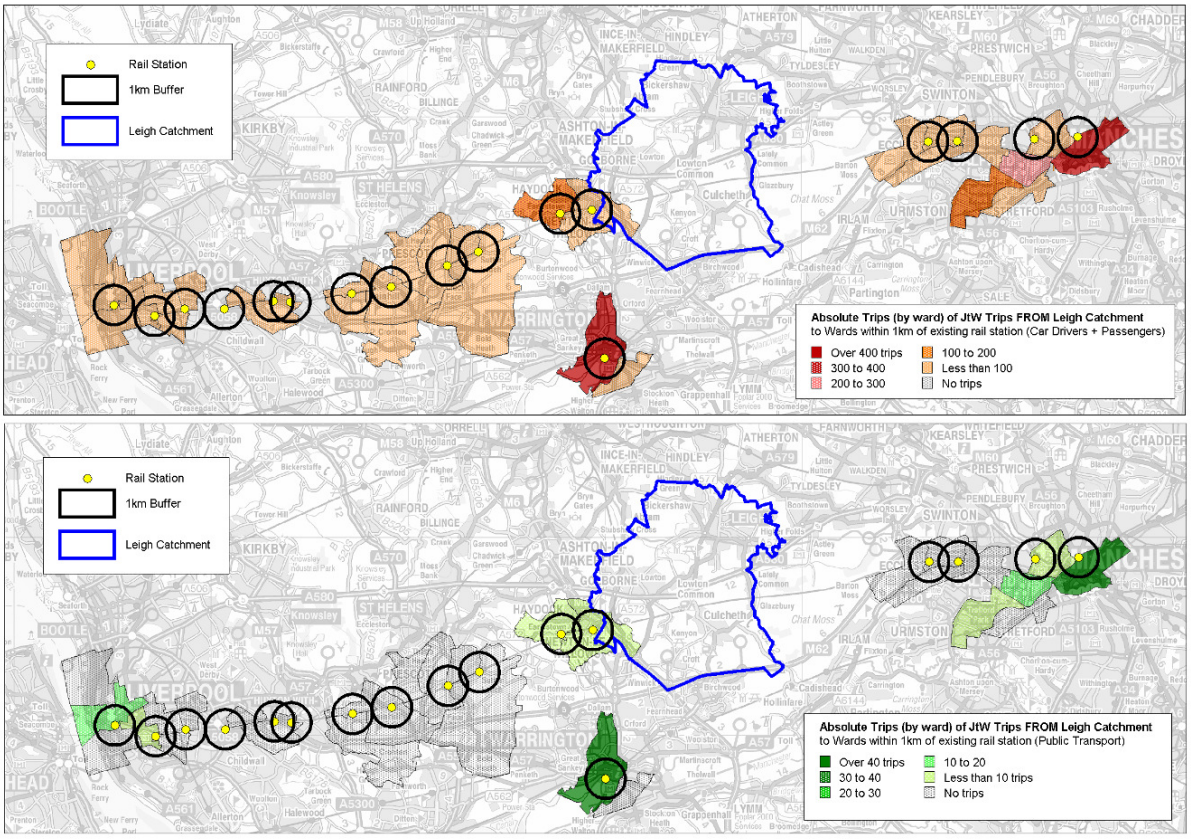
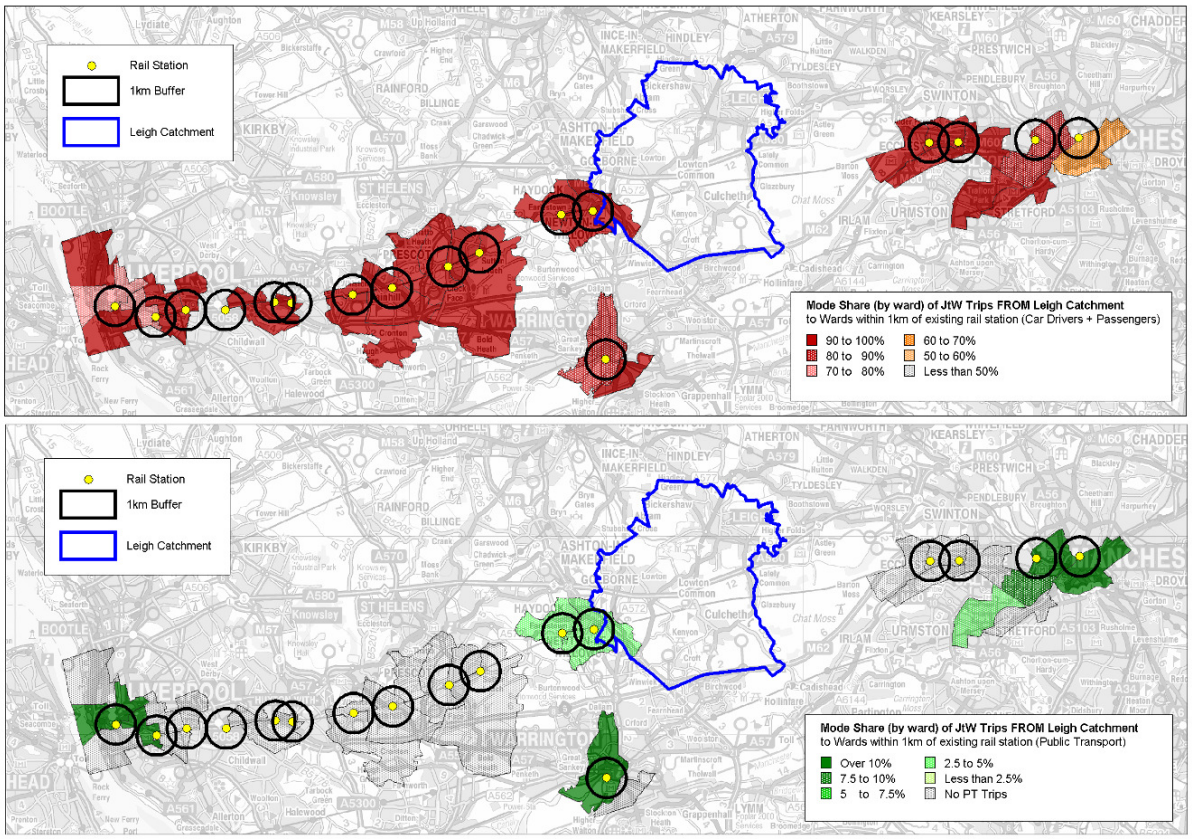


Figure 3.3: Mode Share from Leigh Study Area to Destinations Potentially Served by Rail (Journeys to Work by Ward)



Figures 3.2 and 3.3 further demonstrate the dependency on car for journeys to work from the Leigh study area and to areas potentially served by a future rail service from Leigh.

The share of public transport however is higher to the larger cities and towns of Liverpool, Manchester and Warrington, which is understandable given trends in urban congestion and parking provision.

National Rail Travel Survey

Only the key findings of this analysis are presented within this report, Appendix C should be referred to for further details.

The NRTS rail user origin and destination points are supplied at postcode sector level, accordingly a catchment area for Leigh has been defined based on this information also. Professional judgement has ensured that the scale of the catchment is realistic.

Figure 3.4 shows the rail trip rate per working person in each catchment area. The rate for areas to the south of the catchment is highest, at up to 0.06 trips per person per day, with Newton, Birchwood and Glazebrook stations in these areas. Rates in south Leigh and Pennington have the lower rates and no station within or close the

areas. This is explained to some extent by the socio-economic characteristics of the Leigh catchment, as shown in Figure 3.5 which show levels of income.

Figure 3.4: Rail Trips by Area within the Leigh Catchment

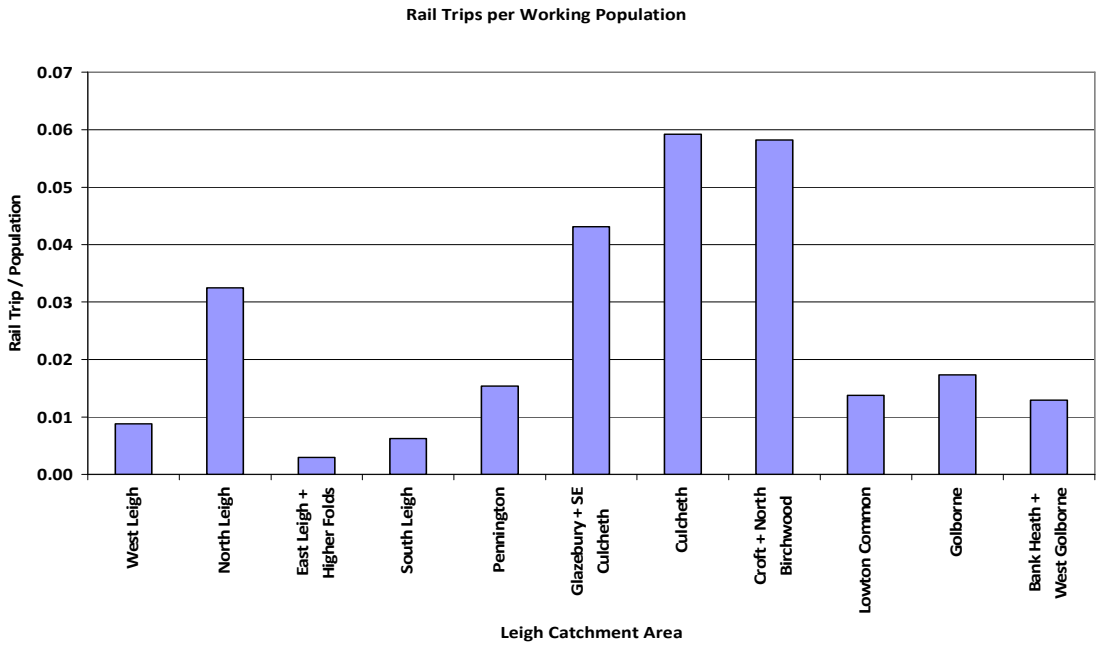


Figure 3.5: Levels of Income within the Leigh Catchment

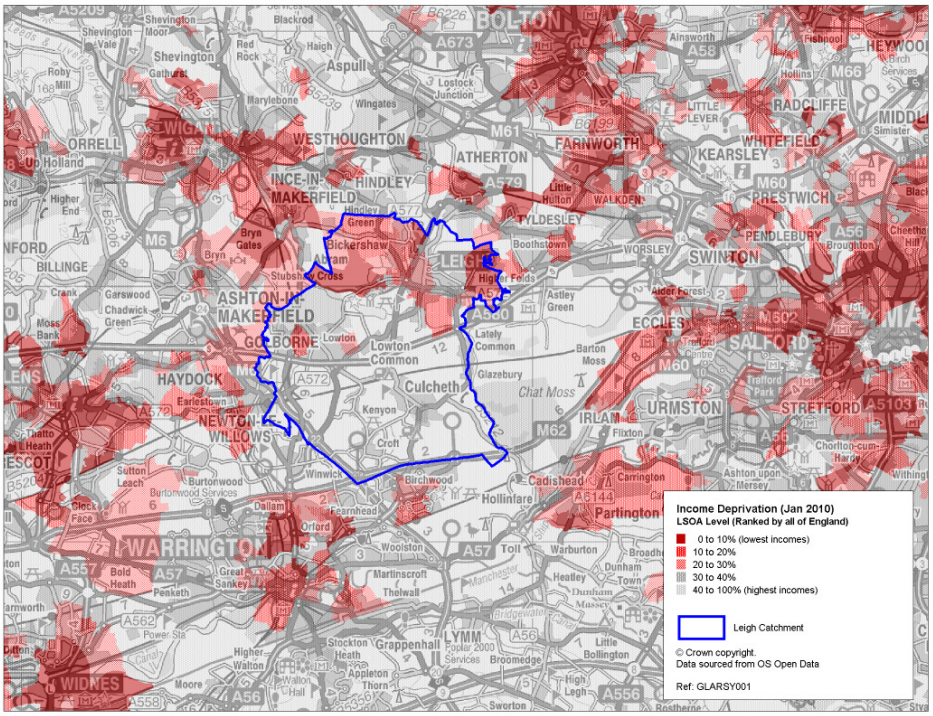


Figure 3.6 indicates the rail stations first used as part of a trip that has originated from within the Leigh catchment, showing passenger demand in the AM Peak, Interpeak, PM Peak and Evening time periods. Figure 3.7 shows the mode of travel used to access the origin station.

The following conclusions have been drawn from analysis of the NRTS data:

- Atherton, Newton-le-Willows and Birchwood are the main stations used by rail passengers in the Leigh catchment area. Atherton is favoured by those in the north of the catchment, and Newton and Birchwood by those in the south of the catchment.
- Manchester is the destination that attracts the largest amount of rail trips from the Leigh catchment;
- 59% of trips that originate within the Leigh catchment and utilise rail travel on their first train prior to 1000 hrs. The corresponding figures are 16% during the Interpeak, 23% during the PM Peak and just 2% during the Evening Peak.
- 48% of trips that terminate within the Leigh catchment and utilise rail travel on their first train between 1600 and 1900 hrs. The corresponding figures are 14% during the AM Peak, 28% during the Interpeak and just 10% during the Evening Peak.
- Birchwood, Atherton and Newton-le-Willows see the most demand of the rail stations that currently serve the Leigh catchment.
- There are only fairly limited records of rail users using public transport to access / egress the stations that currently serve the Leigh catchment. Travel by car and other modes (which include walking and cycling) dominate the access / egress from these rail stations. Atherton sees the largest amount of public transport travel of all the stations.
- Journey purpose data shows that 74% of journeys terminating within the Leigh catchment do so in order to reach home and 12% to reach their normal workplace. In the opposite direction (trips that originate within the Leigh catchment) 26% are seeking to reach home and 35% to reach their normal workplace.
- Across Greater Manchester 89% of rail journeys to a normal workplace walk to both the origin rail station and from the destination rail station. This demonstrates the importance of locating any new rail station facilities within walking distance of employment opportunities.

Figure 3.6: Origin Rail Station Demand (from trips utilising rail with an ultimate origin within the Leigh Catchment)

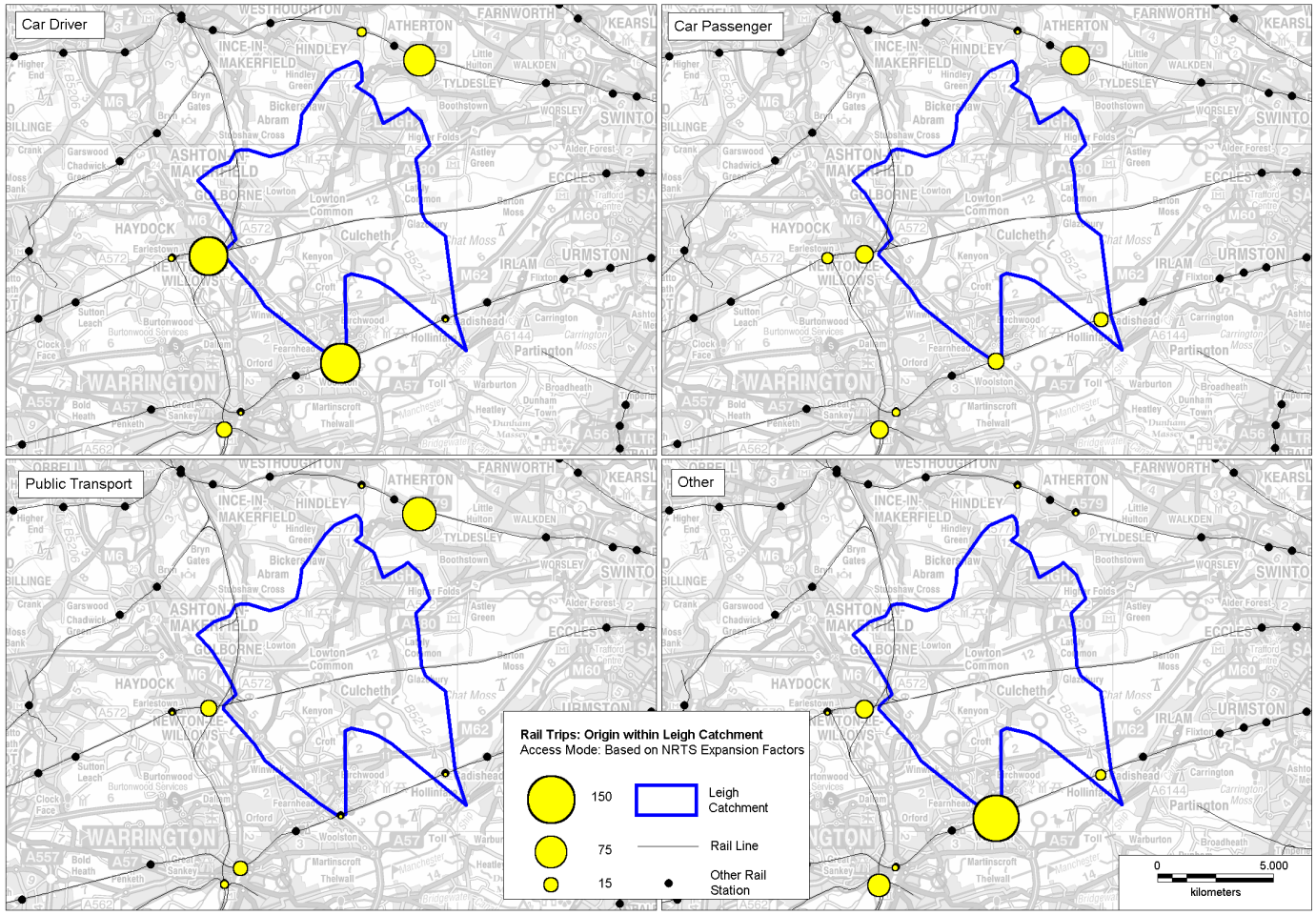


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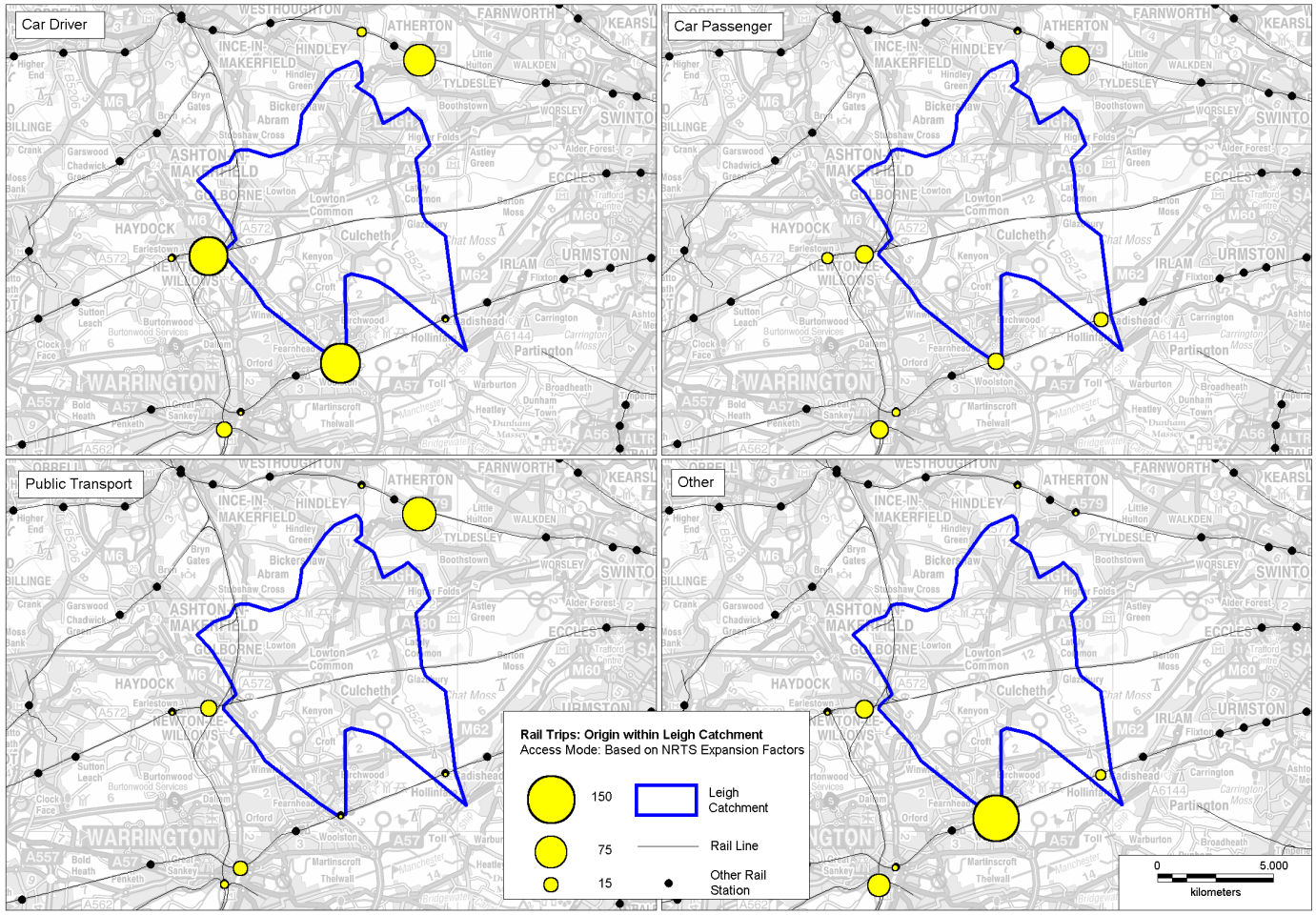
Figure 3.7: Mode of Travel used to Access Origin Rail Station



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3.6 Preferred Options for Appraisal

Option 1 - Pennington to Manchester Victoria Service
Pennington – Eccles – Salford Central- Victoria 2tph service per direction. Run time of 20-24 minutes.

Option 2 - Warrington to Manchester Victoria via Pennington
As Option 1 but with the service extended to Newton-Le-Willows – Earlestown – Warrington Bank Quay. Run time for Pennington to Warrington Bank Quay is 18 minutes.

Option 3 - Pennington Station with Light Rail Shuttle Service
A Parry People Mover, linking Kenyon station to Pennington Station, and then through to Leigh Town centre is assumed. The service will be 4km in length, operate 2tph per direction.

Option 4 - New Station at Glazebury
New station at Glazebury, with 2tph per direction, served by with 1tph Manchester - Liverpool slow service, and 1tph Manchester – Chester service calling at the station. No other stations will lose a service or additional run time will be incurred.

Option 5 - New Station at Kenyon
New station at Kenyon, with 2tph per direction, served by with 1tph Manchester - Liverpool slow service, and 1tph Manchester – Chester service calling at the station. No other stations will lose a service or additional run time will be incurred.

Additional highway link to the station from the East Lancashire Road to be provided, plus additional bus shuttle service to serve the station from Culcheth, Golborne, Lowton, Pennington and Leigh.

The shuttle services are required to provide access to the station for non-car users, as the walk distances to the station are long (over 2km) from the nearest residential areas. The Kenyon station would be heavily dependant on car access and may not fully support the emerging transport strategies in the borough.

4 Preferred Option Costs

4.1 Introduction

This Chapter of the report summarises the costs of each of the preferred options. The costs of infrastructure, signalling, station, facility costs. Also included are costs for park and ride provision, shuttle bus and Parry People Mover (PPM) links and the highway improvements associated with each scheme.

Allowances are made in the costs for project management and development costs, Network Rail costs, risk and contingency. In addition, the level of optimism bias in the costs at 44% is assumed as in accordance with the DfT's guidance for the appraisal of major transport schemes at the preliminary stage of development.

The principle rail infrastructure costs arise from the need to construct a new branch between the Chat Moss Line and the station site. The original Chat Moss connection diverged at Kenyon Junction and continued via Pennington to the old Leigh West station. Much of this alignment has been re-used since the rail route was first closed and now forms the link road into Leigh from the East Lancashire Road. Nevertheless it still provides a reasonable corridor along which to construct a new rail route.

In the new options envisaged the rail route would connect eastbound to the Chat Moss line in order to face Manchester. The original westbound connection would be needed if it is decided to serve Leigh as part of a new Warrington Bank Quay – Manchester service via the new branch.

4.2 Rail Infrastructure Costs

Road-Rail Interfaces

Any new branch is likely to have to cross the East Lancashire Road. As this a dual carriageway A road it is expected that a bridge will be necessary and that the level of the road will be raised to carry it over the new railway, as there is insufficient room for the railway to gain sufficient height to be carried over the road. Tunnelling is impractical for the same reasons, as well as being more costly than a bridge.

It is also envisaged that a level crossing will be needed over a minor public road. No allowance has been made for footpath or private access crossings. It is assumed that any such users will be diverted via local roads to alternative access points.

New Infrastructure Configuration

The branch will have the minimum infrastructure necessary to support each service option as overlaid on the existing draft timetable. The line is assumed to be electrified using the 25 kV AC overhead line system to be adopted for the Chat Moss line and which is in use on the West Coast Main Line. This would allow any new trains to be electrically powered from the start and make maximum use of infrastructure enhancements that are already planned.

Signalling is assumed to be track circuit block, with bi-directional working on single line sections. Junctions are assumed to be of the single lead layout where possible to minimise the infrastructure requirements in the Kenyon Junction area.

Unit Cost Assumptions

Infrastructure costs are based on previous Halcrow cost estimates drawn from industry sources, Halcrow's project experience and Spon's guide to railway industry costs. Where necessary these costs have been updated to account for inflation compared with their base year. The following unit costs have been applied:

- Ballasted plain line track at £750/metre of new line
- Single switches at £167k per additional unit
- Overhead electrification infrastructure and equipment at £35/metre of single track.
- Signalling systems and equipment at £360/metre of new line
- Track lifting for new junction works at £36/metre
- Land purchase at £345 per square metre, assuming a high value due to possible prime residential development land.
- New level crossing at £1,525k per unit
- New road over rail bridge at £2,605k per unit

Plain line track costs are assumed to include the cost of stop blocks at the new station where these are needed. Land costs are assumed to be required for sufficient space to lay the railway, given that the original railway alignment property now forms a highway.

The costs for a new station on the Chat Moss line assumes that there will be no need to alter track layout, add junctions or turnback facilities, or make any alterations to signalling or electrification. All new infrastructure is therefore station rather than railway infrastructure.

The total track lengths for options 1 and 2 are summarised below. The total length for option 2 is nearly double that of option 1 due to higher proportion of the spur needed to be double track. Hence costs such as land, track and electrification are much higher in Option 2.

Track Length in metres	Option 1- Pennington to Manchester Victoria Service	Option 2- Warrington Bank Quay to Manchester Victoria via Pennington
Single Track	2,180	1,550
Double Track	150	1,630
Total Track Length	**2,480**	**4,810**

Project and Contingency Costs

The following allowances have been made for project and contingency costs as a proportion of the total unit costs, that are considered appropriate for a study in the preliminary stages of development:

- Project management – 15%
- Project development cost – 15%
- Interfacing and commissioning costs – 15%

- Network Rail costs – 15%
- Contingency (optimism bias) – 66%

4.3 Station and Facility Costs

Where a station is constructed in Leigh, it is assumed to be placed at Pennington in the south-west quadrant of the junction of the A572 and A579 roads. At Pennington an island platform is envisaged with two platform faces and a single point of platform access at the terminating end of the platform lines. This reduces costs for platform infrastructure and avoids the need for a footbridge or station crossing.

The station is assumed to be built to a ticket office, as demand forecasts exceed the threshold of 250,000 passenger movements per annum for a staffed station to be required. Current standards of compliance are assumed in terms of materials, facilities and Disability Discrimination Act compliance. Stations costs are assumed to have ramped access to the platform, minimum step distance to the train, emergency call points and seating and shelters.

The station on the Chat Moss line is assumed to require two separate platforms (one for each of the running lines). This avoids the need to slew the existing running lines. A ramped footbridge is assumed in order to link the two.

Project and contingency costs are assumed to be the same as in the case of rail infrastructure.

A breakdown of costs for each option can be found in Table 4.1.

4.4 Access Costs

Link Road to Kenyon Station - the route to Wilton Road is close to the old rail line which is now used as an unmade farm road. There are no apparent complications with the construction, hence the cost is £6.1m (2016 prices).

Glazebury Improvements – minor works may be required to address possible local problems, hence a contingency for accommodation works for residents. Total costs is £0.3m (2016 prices).

Park and Ride

The costs for providing park and ride spaces at each site is £3,500 per space based on previous TfGM work. This cost includes for highway access and a high level of landscaping as the proposed sites will be visible to local residents. The operating and maintenance costs are assumed at £400 per space per year. .

Shuttle Services

The cost of operating the bus shuttle services to the Kenyon station stop are based on the number of vehicle hours and kilometres operator, and unit cost per vehicle hour. This costs staffing, vehicle fuel and maintenance costs. Total costs are £0.67m pa for shuttle buses.

The cost of purchasing and operating the Parry People Mover PPM between Leigh Town Centre and Kenyon station is based on evidence from similar schemes and industry information. The cost of the scheme is £30.8m and £1.52m pa for operating.

Table 4.1: Option Capital Costs (all values in 2016 outturn prices)

Cost Item £m's 2016 Outturn Costs	Option 1- Pennington to Manchester Victoria Service	Option 2- Warrington Bank Quay to Manchester Victoria via Pennington	Option 3- Kenyon Station with PPM shuttle service to Pennington and Town Centre	Option 4- New Station at Glazebury	Option 5- New Station at Kenyon with Highway Link and Shuttle Buses
Heavy Rail Costs					
Station	£3.0	£3.0	£6.0	£4.5	£4.5
Track	£3.6	£8.9	£2.9	£0.0	£0.0
Infrastructure / Earthworks	£9.7	£11.2	£5.0	£0.0	£0.0
Signalling	£3.1	£5.5	£1.1	£0.0	£0.0
Electrification	£1.1	£2.1	£0.0	£0.0	£0.0
Land Costs	£6.7	£13.0	£5.8	£0.0	£0.0
Project Costs	£16.0	£26.0	£4.4	£2.2	£2.2
Optimism Bias (66%)	£18.0	£28.9	£15.2	£2.9	£2.9
Sub-Total	**£61.2**	**£98.7**	**£40.4**	**£9.6**	**£9.6**
Access Mode Costs including OB 66%					
Park and Ride	£1.8	£2.6	£1.5	£1.1	£1.5
Highway Link	£0.0	£0.0	£6.1	£0.3	£6.1
Sub-Total	**£1.8**	**£2.6**	**£7.5**	**£1.4**	**£7.5**
Total	**£63.1**	**£101.3**	**£47.9**	**£11.1**	**£17.2**

4.5 Operating Costs

Cost Elements

Operating costs are presented as daily operating costs compiled from the following items:

- Rolling stock lease costs
- Traction power costs
- Train crew costs
- Track access costs

Costs are calculated on the basis on a half hourly service operated 16 hours per day and seven days per week.

Rolling Stock Leasing

Rolling stock lease costs are based on estimated figures for Siemens Desiro stock leased to South West Trains. These are similar to the Class 350 trains operated on the West Coast Main Line by London Midland, and soon also to be operated by Trans-Pennine on its West Coast services. It is not expected that such units will see use on Pennington services, and in practice the Leigh service is more likely to be operated by cascaded stock from elsewhere. Up to now Class 319 trains (operated currently on Thameslink) appear the most likely candidates, but other options could exist. Given that the planned cascade does not take into account a new Leigh service it may not be unreasonable to assume a need for new additional stock as a follow on order from other new build trains. The Desiro costs represents a current best price option, and is inclusive of maintenance, which is carried out by the supplier. Use of mid-life trains would see the cost broken down into lease and maintenance elements.

Rolling stock costs apply per annum and are not related to usage of the stock each day. Hence if stock is not used in off peak hours or on Sundays, there is no saving in leasing costs unless the stock can be used on other services. This is very unlikely as the demand for additional stock at such times is very uncommon given the heavily biased peak hour travel demands on all lines into and from Manchester.

Traction Electricity

Traction power unit costs are difficult to obtain. Network Rail traditionally charges a global traction energy charge to TOCs using electric trains, and this is based on the rate at which NR pays for its electricity supply factored by modelled (rather than measured) consumption rates for different traction types. While some metering is now taking place, charging does not yet reflect this and no published price per kW-hr or per mile for any train type is available. The figure used here is therefore based on traction energy estimates prepared in per vehicle estimates prepared for a single light rail vehicle of £0.24/mile (2011 prices). This has been factored upwards for a 4 car main line train and a figure of £0.96/mile (2011 prices) is used.

Train Crew Costs

Driver cost rates are based on Northern Rail's rate for former First North Western Drivers of £37,053 (2011 wages), 35 hr week (former Arriva Trains Northern drivers

east of the Pennines have different rates and conditions). Sundays are paid at time + 2hrs. Six weeks leave and bank holiday entitlement is assumed and therefore 1610 hrs worked per year. Sundays are assumed to require 2 shifts. The average hourly rate is increased pro-rata to account for higher costs on Sundays

Conductor costs are based on a Northern Rail conductor rate of £20,000, 35 hr week. Sundays are paid at time +25%s. The sources for this figure may be less reliable than for driver rates and there may be some variation on these costs in practice. Six weeks leave and bank holiday entitlement is assumed and therefore 1610 hrs worked per year. Sundays are assumed to require 2 shifts. The average hourly rate increased pro-rata to account for higher costs on Sundays.

Track Access and Electrification Asset Use

Track access charges are broken down into fixed and variable elements. The fixed element has been based on £15k (2011 prices) per year annual charge, which is calculated pro-rata from the current global fixed charge to Northern and based on Halcrow's estimate of existing Northern franchise track mileage by assuming typically double track throughout the network served. Variable track access is assumed to be £4.71 per vehicle mile (2011 prices), based on existing rates charged for the Class 319.

Electrification asset usage charge is based on Network Rail's rate of £1.13 (2011 prices) per vehicle mile for electric trains.

Maintenance of Infrastructure

Maintenance of fixed infrastructure has been calculated as an annual cost of 7.5% of the initial capital cost. This is presented in Table 4.2 as broken down on a annual basis.

4.6 Cost Summary

A summary of the headline costs for each option are provided in Table 4.7.

Table 4.2: Operating Costs (all values in 2016 prices)

Cost Item £m's 2016 Outturn Costs	Option 1- Pennington to Manchester Victoria Service	Option 2- Warrington Bank Quay to Manchester Victoria via Pennington	Option 3- Kenyon Station with PPM shuttle service to Pennington and Town Centre	Option 4- New Station at Glazebury	Option 5- New Station at Kenyon with Highway Link and Shuttle Buses
Heavy Rail Costs					
Leasing	£2.82	£4.22	£0.05	£0.00	£0.00
Train Staffing	£0.73	£1.79	£0.38	£0.00	£0.00
Station Staffing	£0.09	£0.09	£0.15	£0.09	£0.09
Track Access	£0.13	£0.23	£0.00	£0.00	£0.00
Power and Electification	£0.45	£0.73	£1.04	£0.00	£0.00
Sub-Total	**£4.22**	**£7.06**	**£1.62**	**£0.09**	**£0.09**
Access Mode Costs					
Park and Ride	£0.13	£0.18	£0.10	£0.08	£0.10
Bus Shuttle Services	£0.00	£0.00	£0.00	£0.00	£0.67
Sub-Total	**£0.13**	**£0.18**	**£0.10**	**£0.08**	**£0.77**
Maintenance					
Asset Maintenance	£0.23	£0.23	£0.33	£0.33	£0.33
Sub-Total	**£0.23**	**£0.23**	**£0.33**	**£0.33**	**£0.33**
Total	**£4.57**	**£7.46**	**£2.05**	**£0.50**	**£1.20**

Table 4.3: Headline Costs for Each Option - 2016 Outturn Costs in £000's

Option	Heavy Rail Infrastructure Costs	Other Infrastructure Costs	Total Infrastructure Costs	Heavy Rail and Station Operating Costs per annum	Other Support Operating Costs per annum
Option 1- Pennington to Manchester Victoria Service	£61,226	£1,827	£63,054	£4,444	£126
Option 2- Warrington to Manchester Victoria via Pennington	£98,747	£2,558	£101,306	£7,288	£176
Option 3- Pennington Station with rail shuttle service	£9,645	£38,278	£47,923	£426	£1,628
Option 4- New Station at Glazebury	£9,645	£1,420	£11,065	£426	£75
Option 5- New Station at Kenyon	£9,645	£7,524	£17,169	£426	£772

5 Demand and Revenue Forecasts

5.1 Introduction

The approach to demand modelling is defined in this Chapter, covering the forecasts of passenger demand and revenue for each of the proposed options. The forecasts reflect the following potential passenger markets:

- Transfer from car travel.
- Park and ride access to the sites.
- Transfer from existing public transport modes.
- Transfer from existing rail stations.
- Generated demand effects from improved transport services in the Leigh area.

Passenger demand generated and attracted to the Leigh area has been considered for each option. Estimates of revenue are based on current fares (assuming RPI+1% pa) and projected trip patterns. Sensitivity tests have been completed assuming higher fares increases at RPI+3%.

5.2 Existing Transport Models

The approach was taken to maximise use of the existing TfGM GM-SPM2PT (public transport) and GM Saturn (highway) models as these cover the core study area. However a review of these models showed the need reflect wider demand impacts to areas outside of Greater Manchester, notably to Warrington and Liverpool, using additional methods and data, using a combination of generalised cost data from SPM2PT and demand data from the census, NRTS and planning data.

A key part of the demand forecasts will be park and ride. The locations of the proposed stations will result in low walking rates from the catchment areas. Car based park and ride will form the main access mode for trips using a station, hence a separate model was developed to forecast this element of demand as it not part of the main GM-SPM2PT and GMSaturn models.

In summary, the demand estimates for the proposed rail services are based on the following methods:

- **Abstraction from existing public transport modes** - for services to Manchester SPM2PT model has been used for demand and cost savings, and for services to Warrington and Liverpool, SPM2PT model has been used to generate the cost saving per passenger, with demand from external data sources.
- **Abstraction from car** – forecasts for park and ride have come from the P+R model developed for this study. This model use data from the GMSaturn model and parameters from the wider park and ride assessments completed within Greater Manchester.
- **Wider Behavioural Changes** – based on TfGM Appraisal Template, and covering generated demand.

The forecasts have been benchmarked against demands at existing rail stations.. The results of this benchmarking exercise are reported in Chapter 8.

5.3 GMSPM2PT

This study has utilised the SPM2PT model for option testing purposes. The model covers the whole of the Greater Manchester County and main settlements in the immediate surrounding area, such as Warrington and Newton-le-Willows, and has all heavy rail, Metrolink and bus services coded into the model network. Trip matrices of passenger movements were developed from survey data, mostly GMATS – Greater Manchester Area Transport Surveys, and models for the weekday AM peak (0800-0900 hours) and average interpeak hour (1000-1500 hours) are available.

The models are 2008 based, with forecast networks and matrices available for 2016. The networks include schemes in the Transport Delivery Programme (TDP), so includes the Leigh Manchester Guided Busway project. This package of schemes are in the "do-minimum" scenario against which each of the proposed rail options has been assessed.

The following issues were checked in relation to the calibration and validation of the model to ensure it is a robust platform for forecasting. Where necessary adjustments were made to the base models and within the appraisal process to reflect any major concerns:

- Model zoning.
- Local bus services stopping patterns, frequencies and journey times.
- Rail service run times and frequencies in the corridor.
- Rail demand at local stations and loadings on the Chat Moss line
- Trip matrix and distribution.

5.4 Park and Ride Model

Given the importance of park and ride demand for access to the proposed stations, a local park and ride model was developed using the similar approaches adopted by Halcrow for other rail corridors within Greater Manchester.

The park and ride LOGIT model examined the scope for transfer from car "drive all the way" trips to transfer to rail park and ride, based on the relative costs of using each mode and the origin and destination of the trips. Estimates of the car trips have been made from the GM Saturn Model, with allowances for under-reporting of trips to Warrington and Liverpool applied using census data. Only car trips paying to park in key centres are included in the models.

A catchment of 5km was defined around each proposed new station at Pennington, Glazebury and Kenyon. The size of the catchment was defined from evidence of park and ride trip patterns at two existing stations in the local area, Horwich Parkway close the M61 junction 6 and Lea Green close to the M62 junction 7. The destinations for trips are the core centres of Manchester, Warrington and Liverpool. Allowance has been made in the forecasts for wider destination with an uplift in forecasts of 73% based on census data.

The costs of travel for each model included the following:

- Car Drive all Way – travel time, fuel costs, parking charges;
- Park and Ride – car drive to site, fuel cost, on train time, fare, wait time for service and walk time from destination station.

It is assumed there is no parking charge at any of the new station park and ride sites. This is consistent with other local station such as Newton-le-Willows, Birchwood and Atherton.

The parameters used in the LOGIT model for estimating mode share between the car drive all the way and park and ride given the relative costs of each, are taken from the previous models developed by Halcrow for corridors within Greater Manchester.

Demand forecasts were produced for the AM peak 8-9hour and Interpeak average 10-15hour. Daily demand estimates were factor as below, taken from evidence of arrival and departure patterns at existing rail stations:

- Daily parking demand = 3 * AM peak hour + 3 * Interpeak Hour
- Weekly demand is weekday * 6.3, where Saturday is 0.8 of weekday and Sunday is 0.5 of weekday
- Annual Demand is weekly demand * 52

Estimates of number of spaces required was based on the following assumptions:

- Turnover of spaces per day is 1.1 cars per space;
- Busiest days are 20% more than average weekday;
- Growth in demand of 20% is assumed for 15 years to 2031;
- Number of spaces is then rounded up to nearest 50 spaces.

The number of rail passenger trips generated by park and ride is double the number of cars generated, with an uplift of 1.2 for average car occupancy, i.e. 1 car parked generates a total of 2.4 single rail trips.

If higher demand growth is assumed, then the number of parking spaces required will increase, hence scheme costs will increase. The 20% growth above assumes parking capacity by 2031.

The park and ride model does not forecast "kiss and ride" trips. Such trips are included in additional demand estimates in the Appraisal process.

5.5 Demand Growth

The growth in modelled demand in the Leigh area has been derived using the GM SPM2 model (LUTI - Land Use Transport Interactive Model) where transport packages in the GM TDP – Transport Development Package, are modelled and will attract trips to their corridors. The current 2016 matrices were used in the SPM2PT option test runs.

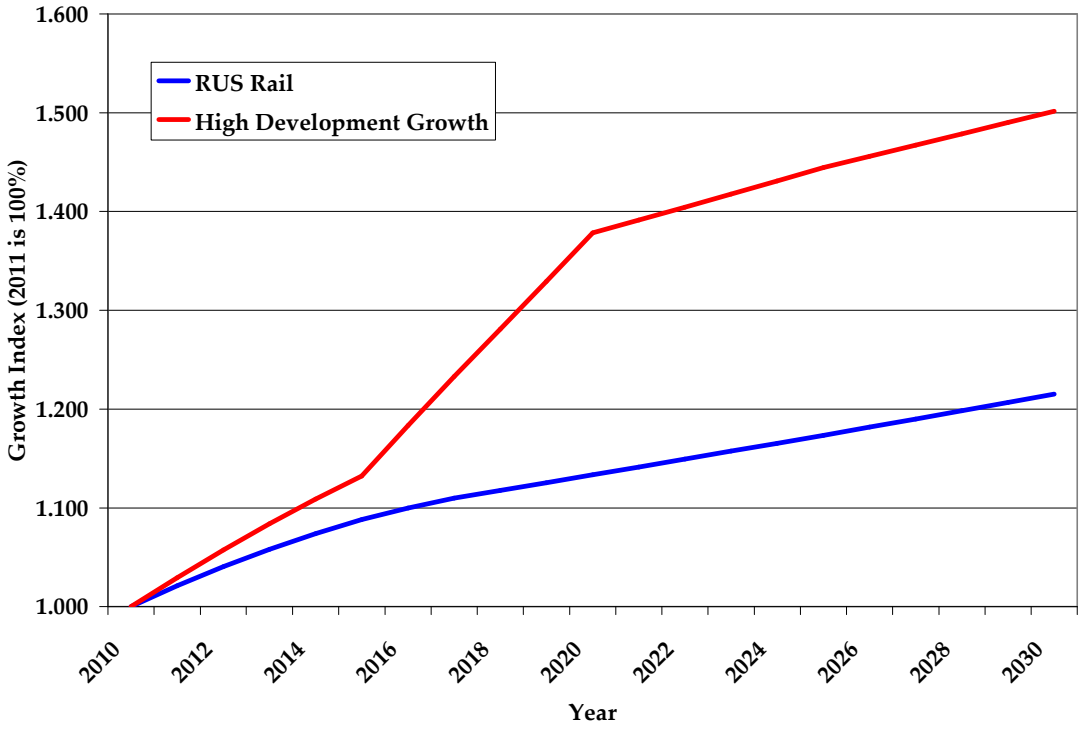
To reflect the proposed developments within Leigh area, a revised set of demand growth factors was applied in the appraisal process using the development information provided by Wigan and Warrington Councils. Benefits and revenues were uplifted using the same factors.

Consultation was undertaken with officers of the Wigan and Warrington Councils planning teams in order to ascertain the scale of development that is proposed within the study area. This provided details of the required information for each development site was established, as set out below, and summarised in Table 2.2.

- Development name and location;
- Development type;
- Site area / number of units;
- Expected implementation date (5 year phases to 2030);
- Status of the proposal; and
- Details of the current land use if a replacement.

The information was used to calculate the number of generated trips using standard trip rates, assumption on replacement land use, model split and daily flow trip estimates.

Figure 5.1: Comparison of Demand Growth Profiles



5.6 Revenue Forecasts

The estimates of future rail revenue are based on standard methods developed for previous work by TfGM. The average fare per trip is computed based on a mix of different ticket types, including concessions, and peak and off peak tickets.

The estimates of fare (Adult Return peak and offpeak) to each of the key destinations for each station option are as in Table 5.1. The table includes fares from the three main existing stations used within the Leigh catchment area.

The impact on revenue to existing rail and bus services is reflected in the forecasting and appraisal process, as such changes can impact on levels of subsidy required to operators from local and central Government, and are a hidden cost to the proposed schemes.

Table 5.1: Peak and Off Peak Adult Return Fares

Origin and Destination Stations	Manchester City Centre	Warrington Town Centre	Liverpool City Centre
New Stations			
Pennington	£7.10 / £6.70	£5.70 / £5.10	£8.10 / £6.70
Glazebury	£5.90 / £5.30	£5.70 / £5.10	£8.10 / £6.70
Kenyon	£6.60 / £6.20	£5.00 / £4.40	£7.40 / £6.00
Existing Stations			
Newton-Le-Willows	£7.30 / £6.90	£4.30 / £3.70	£5.60 / £5.60
Birchwood	£7.00 / £6.30	£2.90 / £2.50	£7.90 / £6.30
Glazebrook	£5.50 / £3.30	£3.90 / £3.80	£10.10 / £8.10
Atherton	£6.80 / £3.60	£10.50 / £8.10 *	£9.80 / £8.80 *

Note: Existing Station Fares are from current 2011 National Rail website.

****no direct service***

5.7 Demand Forecasts

The estimates of demand for each option are presented in Table 5.3. The breakdown of demand by abstraction mode is shown, plus AM, interpeak, daily and annual demands.

The other demand shown represents generated demand from travel times from the scheme resulting in new trips made on the services, that were not made by bus, car or rail before.

Table 5.3 shows the source of the demand, covering existing rail (direct access and park and ride). The flows are illustrated in Figure 5.2.

Table 5.4 reports the stations where existing rail demand is expected to be abstracted from to the new stations. Values are single trips. The flows are illustrated in Figure 5.3.

Table 5.2: Demand Forecasts in 2016

Demand Forecasts	Option 1- Pennington to Manchester Victoria Service	Option 2- Warrington to Manchester Victoria via Pennington	Option 3- Pennington Station with rail shuttle service	Option 4- New Station at Glazebury	Option 5- New Station at Kenyon
AM Peak Hour					
Existing PT Demand	63	100	48	21	46
Park and Ride	57	78	46	29	46
Other Demands	26	38	4	3	6
Total	**146**	**215**	**97**	**53**	**98**
Inter Peak Hour					
Existing PT Demand	29	52	29	12	42
Park and Ride	21	31	19	13	19
Other Demands	11	18	2	2	4
Total	**61**	**101**	**50**	**26**	**65**
Daily Demand - Boarders and Alighters	**1,250**	**1,920**	**900**	**480**	**1,010**
Weekly Passenger Demand	**7,200**	**11,100**	**5,200**	**2,800**	**5,800**
Annual Total Passenger Demand	**375,000**	**576,000**	**270,000**	**144,000**	**303,000**
Park and Ride Space Requirements	250	350	200	150	200

Table 5.3: Source of Rail Forecast Demands

Demand Forecasts	Option 1- Pennington to Manchester Victoria Service	Option 2- Warrington to Manchester Victoria via Pennington	Option 3- Pennington Station with rail shuttle service	Option 4- New Station at Glazebury	Option 5- New Station at Kenyon
Existing Bus	111,000	186,000	120,000	43,000	48,000
Existing Rail	55,000	93,000	23,000	19,000	121,000
Existing P+R	42,000	59,000	35,000	22,000	35,000
New P+R	98,000	137,000	82,000	52,000	82,000
Other	68,000	101,000	11,000	9,000	18,000
TOTAL	**375,000**	**575,000**	**270,000**	**145,000**	**304,000**
New Rail	**278,000**	**423,000**	**212,000**	**104,000**	**148,000**
Existing Rail	**97,000**	**152,000**	**58,000**	**41,000**	**156,000**

Figure 5.2: Rail Demand Source

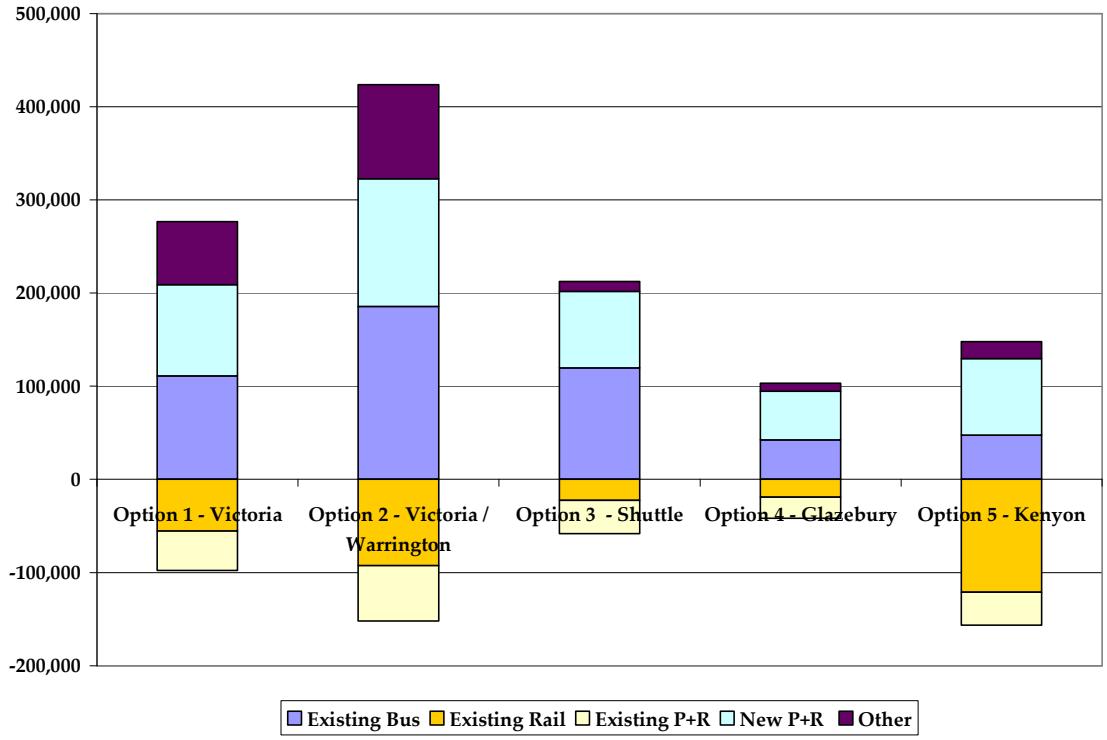
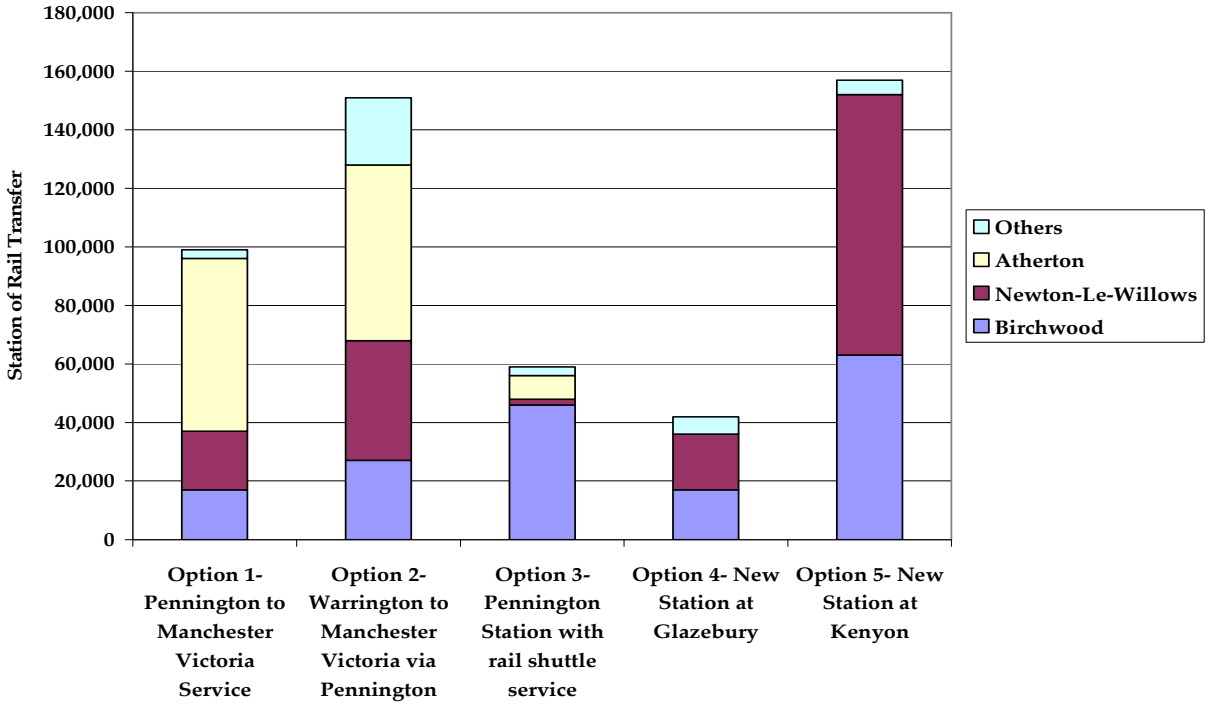


Table 5.4: Rail Abstraction Demands

Station	Option 1- Pennington to Manchester Victoria Service	Option 2- Warrington to Manchester Victoria via Pennington	Option 3- Pennington Station with rail shuttle service	Option 4- New Station at Glazebury	Option 5- New Station at Kenyon
Birchwood	17,000	27,000	46,000	17,000	63,000
Newton-Le-Willows	20,000	41,000	2,000	19,000	89,000
Atherton	59,000	60,000	8,000	0	0
Others	3,000	23,000	3,000	6,000	5,000
TOTAL	**98,000**	**151,000**	**58,000**	**42,000**	**156,000**

Figure 5.3: Rail Abstraction Source



Option 1 of running a Pennington to Victoria half hourly service will attract 375,000 passenger trips per assume at Pennington, the equivalent of 1,250. Some 44% of the demand is forecast to come from existing public transport service notably bus, with 38% of demand being park and ride. The remaining 18% of demand will be new trips generated from the travel time saving and new destination opportunities provided by the service. Overall, 26% of demand at the station would be existing rail demand transferring from other local station, such as Atherton, Birchwood and Newton-le-Willows. A car park of 250 spaces would be required at the station.

Extending the service to Warrington (Option 2) would add a further 201,000 trips. A similar pattern of trips abstraction and generated demands is forecasts. The Pennington station car park would have to increase to 350 spaces.

Operating a shuttle service between a new station on Chat Moss at Kenyon and Pennington and Leigh centre (option 3) would attract 270,000 trips per annum. Over 60% of trips would come from bus.

A new station at Glazebury (option 4) would attract 144,000 trips per annum, with 43% of demand from existing public transport, 51% from park and ride and 6% from generated demand. A 150 space car park would be required.

A new station at Kenyon (option 5), with improved highway access and bus feeder services, would attract 303,000 trips per annum, with 55% of demand from existing public transport, 39% from park and ride and 6% from generated demand. Some 51% of demand would be existing rail passenger transferring from local station, notably at Birchwood and Newton-le-Willows. The high demand from exisiting public transport shows demand at the Kenyon station includes many trips using

the proposed shuttle buses from Leigh, Pennington, Lowton, Golborne and Culcheth. A 200 space car park would be required at the site.

5.8 Revenue Impacts

The estimates of revenue from the schemes are reported in Table 5.5, assuming fares increase at RPI+1%pa. The results show the gross and net rail revenue (in £m's per annum), so reflect the existing rail abstraction effects. The net revenue per rail trip (in £'s) in each option is reported.

The high percentage of new rail demand in Options 1 and 2 results in higher revenue and revenue per trip. The new stations on Chat Moss attract many existing passengers so the revenue impact is lower.

Table 5.6 shows the revenues against operating costs. All options show net revenues fail to exceed costs, so all options would require a subsidy.

Table 5.5: Estimates of Revenue (2016 £m's pa)

Revenue Forecasts	Option 1- Pennington to Manchester Victoria Service	Option 2- Warrington to Manchester Victoria via Pennington	Option 3- Pennington Station with rail shuttle service	Option 4- New Station at Glazebury	Option 5- New Station at Kenyon
Gross Revenue 2016 £m's	£2.6	£3.6	£0.6	£0.4	£1.5
Net Revenue 2016 £m's	£1.6	£2.2	£0.4	£0.3	£0.6
Net Revenue per Trip £'s	£4.35	£3.92	£1.53	£1.85	£1.98

Table 5.6: Estimates of Operating Subsidy (2016 £m's pa)

Revenue Forecasts	Option 1- Pennington to Manchester Victoria Service	Option 2- Warrington to Manchester Victoria via Pennington	Option 3- Pennington Station with rail shuttle service	Option 4- New Station at Glazebury	Option 5- New Station at Kenyon
Gross Revenue	£2.6	£3.6	£0.6	£0.4	£1.5
Net Revenue	£1.6	£2.2	£0.4	£0.3	£0.6
Operating Cost	£4.6	£7.5	£1.8	£0.5	£1.2
Subsidy	£2.9	£5.2	£1.4	£0.2	£0.6

Note: All values in 2016 values in £m's

5.9 Other Impacts

Travel Time Savings

Example of travel time and cost savings from the Pennington station are shown in Table 5.7, for a trip to Manchester St Peter's Square and Victoria station area.

The rail service offers between 7 and 45 generalised cost minutes saving. The savings are in on-vehicle time and boarding / interchange, with walk, wait and fare all increasing for using the new train service.

The changes are as expected, with the train being faster than the bus so offering lower on-vehicle times. However the rail station is further to walk to than a local bus stop and the frequency of service is lower, so wait time for the service is higher. Rail fares are also more expensive than bus fares per kilometre travelled.

Table 5.7: Example of Travel Time Savings for Pennington Options

Scenario	Walk Time	On-Vehicle Time	Wait time	Boarding and Interchange Penalty	Fare in GC mins	Total GC minutes
Pennington to St Peter's Square						
No Rail at Pennington	60	44	11	10	12	137
With Pennington – Victoria Service	68	21	23	0	19	130
Change	**8**	**-23**	**12**	**-10**	**7**	**-7**
Pennington to Victoria						
No Rail at Pennington	24	38	29	15	34	141
With Pennington – Victoria Service	33	21	23	0	19	96
Change	**9**	**-17**	**-6**	**-15**	**-16**	**-45**

Leigh Guided Busway Impacts

The impact of LSM of each proposed rail option is summarised in Table 5.8. All options will reduce demand of the LSM with the options of a station in Pennington having the largest reductions.

Table 5.8: LSM Impacts

Option	Annual Demand Changes	Percentage Reduction
Option 1- Pennington to Manchester Victoria Service	-73,000	-12.2%
Option 2- Warrington to Manchester Victoria via Pennington	-94,000	-15.7%
Option 3- Pennington Station with rail shuttle service	-18,000	-2.4%
Option 4- New Station at Glazebury	-12,000	-1.6%
Option 5- New Station at Kenyon	-38,000	-4.9%

Train Loading Impacts

The forecast change in rail passenger demand in the AM peak hour in 2016 on the approach to Patricroft station is shown in Table 5.9. The increase in capacity from new services are part of the proposed options is also shown in the table.

Table 5.9: Rail Capacity Issues

Option	Increase in Demand	Percentage Increase	Increase in Capacity from New Services
Option 1- Pennington to Manchester Victoria Service	106	7.2%	500
Option 2- Warrington to Manchester Victoria via Pennington	106	7.2%	500
Option 3- Pennington Station with rail shuttle service	45	3.1%	0
Option 4- New Station at Glazebury	27	1.8%	0
Option 5- New Station at Kenyon	82	5.6%	0

Reduction in Car Trips

With the introduction of the proposed rail services, the number of car kilometres forecasts to be removed from the highway network to key centres is as below.

Table 5.10: Impacts on Car Kilometres

Option	Car Kilometres 2016 Annual Forecasts
Option 1- Pennington to Manchester Victoria Service	3,473,000
Option 2- Warrington to Manchester Victoria via Pennington	6,009,000
Option 3- Pennington Station with rail shuttle service	445,000
Option 4- New Station at Glazebury	538,000
Option 5- New Station at Kenyon	728,000

6 Economic Appraisal

6.1 Introduction

This Chapter of the report summarises the results of the outline economic appraisal of preferred options. The value for money analysis covered economic appraisal, which included the generation of DfT BCR values. Benefits of the options were estimated using the SPM2PT and Park and Ride model (as described in Chapter 5) and the standard TfGM appraisal template. Included in the template were revenue impacts for all public transport modes and scheme costs, including capital, maintenance, renewals and operating costs, and reflect the required of DfT's WebTAG and Network Rail's GRIP processes.

6.2 Economic Appraisal

The value for money of each scheme is expressed by the Benefit to Cost Ratio (BCR). The calculation of the BCR is based on the TfGM appraisal template used to assess a range of schemes. The appraisal is completed over a 60 year scheme lifetime (assumed to be 2016 to 2075). Benefits are inflated over this period as values of time increase (in accordance with DfT's WebTAG), increase traffic congestion, public transport fare increases at RPI+1%, and costs are inflated based on construction and rail industry guidance.

All values in the economic appraisal are expressed in 2002 prices and values, as required by DfT's WebTAG.

The benefits of the scheme include the following:

- **User Benefits -** time savings (terms generalised travel costs as it includes walk, wait, in-vehicle, interchange and fare elements of a journey) offered to passengers as a result of the proposed rail route and service. Examples of the time savings are shown in section 5.9, and show the train is faster than the bus so offering lower on-vehicle times. However the rail station is further to walk to than a local bus stop and the frequency of service is lower, so wait time for the service is higher. Rail fares are also more expensive than bus fares per kilometre travelled.

- **Non-User Benefits -** decongestion on the highway network from car users switching to use rail, resulting is less traffic congestion in the future on route to the key centres of Manchester, Warrington and Liverpool. Congestion benefits are assumed to increase over time as highway journey times increase with more traffic using the networks. Non-user benefits also include savings is accidents, and less noise and reduced vehicle emissions from less congestion and traffic.

- **Bus Operator Impacts –** reflects change in revenue and operating costs as a result of the rail schemes. For most options, the impact is negative as bus passengers switch to rail, so the bus operator will get less revenue. For Option 5, with feeder buses provided, the impact is positive as the extra revenue generated will cover costs.

- **Rail Revenue** – the net revenue gain to the operator from the farebox revenue is reported, including the impact of existing rail passengers transferring from

other services, so adding no extra revenue to the overall network totals. Rail fares are assumed to grow at RPI+1% to year 2031.

- **Rail Operating Costs** – the costs, as defined in Table 4.2, are reported over 60 years in the appraisal. Inflation and real cost increases are reflected in the costs.
- **Grant Subsidy** – this value is the difference in the rail revenue and operating costs, where the former is less than the latter, showing the level of additional funding support the service would require to be operated.
- **Indirect Tax Changes** – the impact to the Government of less fuel duty tax from less traffic on the roads and less fuel purchased as car users switch to using the train, is reflected as a negative benefit of the scheme.
- The benefits of the scheme are summed to form the **Present Value of Benefits (PVB)**. All values are reported in 2002 prices and values.

The costs of the scheme are expressed as

- **Government Capital costs** – costs are reported in Table 4.1. The costs assuming a construction year of 2015, and scheme opening in 2016.
- **Government Subsidy** – the same subsidy value as reported in the benefits, reflecting the difference in revenues and costs.
- The costs of the scheme are summed to form the **Present Value of Costs (PVC)**. All values are reported in 2002 prices and values.

The two main values reported for each scheme are as below:

- **Net Present Value,** NPV = PVB – PVC
- **Benefit to Cost Ratio,** BCR = PVB / PVC

A BCR value, after allowing for optimism bias, of over 2.0 is required by DfT for a scheme to be considered for funding. Values below 2.0 are seen as "low", values between 2.0 and 4.0 are "high" and values over 4.0 are "very high".

6.3 Appraisal Results

The results are presented in Table 6.1, with sensitivity tests in Table 6.2 for Option 2 and Table 6.3 for Option 5. All results are presented in 2002 prices and values, as required in a funding submission to the DfT.

The key points to note from the results in Table 6.1 are listed below:

- The economic appraisal of the options shows Options 1,2 and 3 to have a very poor case, with the DfT BCRs being all less than 1.0. The benefits of these schemes are well below the costs, hence all show no value for money.
- The new station options 4 (Glazebrook) and 5 (Kenyon) on the Chat Moss line show BCRs of 1.25 and 1.40, so are "low" value for money respectively using the DfT criteria.
- No scheme exceeds the critical DfT value of 2.0.

Table 6.1: Economic Results for Options (All results at 2002 prices and values in £000's)

Value in £m's in 2002 prices and values	Option 1- Pennington to Manchester Victoria Service	Option 2- Warrington Bank Quay to Manchester Victoria via Pennington	Option 3- Kenyon Station with PPM shuttle service to Pennington and Town Centre	Option 4- New Station at Glazebury	Option 5- New Station at Kenyon with Highway Link and Shuttle Buses
Benefits					
User Benefits	23,036	39,852	1,384	3,900	4,747
Non-User Benefits	50,966	90,965	6,535	7,892	10,688
Bus Operator Impacts	-9,310	-12,103	-2,799	-1,783	5,528
Rail Revenue	34,182	46,515	8,661	5,585	12,584
Rail Operating Costs	-70,701	-115,625	-31,548	-7,454	-18,260
Grant Subsidy	36,520	69,110	22,887	1,869	5,676
Indirect Tax Change	-4,098	-7,090	-367	-693	-964
Present Value of Benefits (PVB)	**60,593**	**111,623**	**4,753**	**9,316**	**19,999**
Costs					
Government Capital Costs	31,768	51,041	24,145	5,575	8,650
Government Subsidy	36,520	69,110	22,887	1,869	5,676
Present Value of Costs (PVC)	**68,288**	**120,151**	**47,032**	**7,444**	**14,326**
Net Present Value (NPV)	**-7,694**	**-8,528**	**-42,279**	**1,872**	**5,673**
Benefit to Cost Ratio (BCR)	**0.89**	**0.93**	**0.10**	**1.25**	**1.40**

6.4 Sensitivity Tests

The following sensitivity tests have been completed on the tests as below, with results presented in Table 6.2. All tests were completed on Option 2 – Victoria to Pennington – Warrington Bank Quay service and Option 5 - Kenyon Station.

- Assuming rail fares increase at RPI+3%, instead of RPI+1%, will reduce the subsidy of service, though the change in BCR for option 1 would be same given the size of the overall subsidy required. . Option 2 BCR would be 1.01 and Option 5 would be 2.02.
- The effect of excluding a booking office and staff at stations has a marginal impact on the case, as the overall cost savings are small. Option 2 BCR would increase to 0.97 and Option 5 BCR would increase to 1.48.
- Assuming less new rolling stock is required for Option 2, so 3 car units instead of 4 car units (assuming the former is available) would reduce leasing costs by 25%. The BCR would increase to 1.10 from 0.93.
- Assuming lower capital costs (as estimated by Stobart at £41m excluding OB – a saving of 26%) would increase the BCR from 0.93 to 1.05 for option 2. The capital cost is about 25% of overall scheme costs, with operating and maintenance being 75% of the total, hence the impact of savings of 26% in capital cost do not change in the BCR significantly.
- An hourly service from Warrington - Pennington to Victoria, and assuming the Stobart Costs, the BCR for the scheme will increase to 0.93, from 1.16. There is a substantial reduction in operating costs, but demand, revenue and benefits are also reduced as an hourly service is less attractive than a half hourly service.
- Development Assumptions - Review of development assumptions (see section 5.5) produced an optimistic demand growth profile. The higher development growth assumptions will increase the BCR to 1.48, assuming hourly service and Stobart costs. The assumptions in this case are considered very risk, with lowest costs and highest demand, so is the extreme estimate of the BCR.
- The case for Option 5 Kenyon Station will reduce if greater disbenefit is assumed to through passengers (4 minutes from the 2 minutes in the base case) from the extra stop. The BCR will be 1.03.
- The case will also reduce if fewer bus shuttle services are provided to the station, so services from Lowton, Golborne and Culcheth are excluded. The BCR will be 1.09. Both tests show the case for Kenyon station is marginal.
- Negative impact to through passengers on the Chat Moss service due to increases in timetable from additional stop at new station (option 5). All though passengers getting 3 minutes extra to their journey would reduce the BCR to 1.28 from 1.68, hence show poor value for money.

Table 6.2: Economic Results – Sensitivity Tests for Option 2 (All results at 2002 prices and values in £000's)

Value in £m's in 2002 prices and values	Option 2- Warrington Bank Quay to Manchester Victoria via Pennington	Option 2 - Fares at RPI+3%	Option 2 - Exclude Staffing and Booking Office	Option 2 - 25% Reduction in Rolling Stock Leasing Costs	Option 2 - Stobart Costs	Option 2 - Stobart Costs with Hourly Service	Option 2 - Stobart Costs, Hourly Service and Higher Growth
Benefits							
User Benefits	39,852	36,664	39,852	39,852	39,852	31,483	36,835
Non-User Benefits	90,965	81,118	90,965	90,965	90,965	69,655	81,497
Bus Operator Impacts	-12,103	-8,565	-12,103	-12,103	-12,103	-7,355	-8,605
Rail Revenue	46,515	65,865	46,515	46,515	46,515	36,747	42,994
Rail Operating Costs	-115,625	-115,625	-111,578	-96,778	-115,625	-75,156	-75,156
Grant Subsidy	69,110	49,760	65,063	50,263	69,110	38,409	32,162
Indirect Tax Change	-7,090	-7,090	-7,090	-7,090	-7,090	-5,601	-6,554
Present Value of Benefits (PVB)	**111,623**	**102,126**	**111,623**	**111,623**	**111,623**	**88,182**	**103,173**
Costs							
Government Capital Costs	51,041	51,041	50,020	51,041	37,691	37,691	37,691
Government Subsidy	69,110	49,760	65,063	50,263	69,110	38,409	32,162
Present Value of Costs (PVC)	**120,151**	**100,801**	**115,083**	**101,304**	**106,801**	**76,100**	**69,853**
Net Present Value (NPV)	**8,528**	**1,325**	**-3,460**	**10,319**	**4,822**	**12,082**	**33,320**
Benefit to Cost Ratio (BCR)	**0.93**	**1.01**	**0.97**	**1.10**	**1.05**	**1.16**	**1.48**

Table 6.3: Economic Results – Sensitivity Tests for Option 5 (All results at 2002 prices and values in £000's)

Value in £m's in 2002 prices and values	Option 5- New Station at Kenyon with Highway Link and Shuttle Buses	Option 5 - Fares at RPI+3%	Option 5 - Higher Demand Growth	Option 5 - Unstaffed Station and No Booking Office	Option 5 - Greater Disbenefits to Through Passengers	Option 5 - Less Feeder Services
Benefits						
User Benefits	4,747	4,367	5,554	4,747	1,187	4,043
Non-User Benefits	10,688	9,833	12,505	10,688	9,686	10,851
Bus Operator Impacts	5,528	5,086	6,468	5,528	6,047	-71
Rail Revenue	12,584	17,820	14,724	12,584	11,405	7,200
Rail Operating Costs	-18,260	-18,260	-18,260	-17,621	-18,260	-12,417
Grant Subsidy	5,676	441	3,537	5,037	6,856	5,217
Indirect Tax Change	-964	-964	-1,127	-964	-873	-956
Present Value of Benefits (PVB)	**19,999**	**18,322**	**23,399**	**19,999**	**16,046**	**13,867**
Costs						
Government Capital Costs	8,650	8,650	8,650	8,477	8,650	7,538
Government Subsidy	5,676	441	3,537	5,037	6,856	5,217
Present Value of Costs (PVC)	**14,326**	**9,091**	**12,187**	**13,514**	**15,506**	**12,756**
Net Present Value (NPV)	**5,673**	**9,231**	**11,212**	**6,485**	**539**	**1,111**
Present Value of Benefits (PVB)	**1.40**	**2.02**	**1.92**	**1.48**	**1.03**	**1.09**

7 Funding and Delivery

7.1 Introduction

This Chapter of the report summarises issues relating funding and affordability of the preferred options, and the overall delivery case.

7.2 Delivery Issues and Risks

Infrastructure Development

The rail industry is committed to the Northern Hub initiative in its entirety, as presented in the Initial Industry Plan, as a means of easing capacity constraints. The current scheme is already identified as leaving some junctions and corridors close to their capacity limit, even without the addition of completely new services above and beyond those already envisaged. This being so there may be reluctance at Network Rail to accept additional trains if they consider that they may threaten the operating robustness of the services already planned. Additional infrastructure works not envisaged by this study may be required as a condition of the new service, thereby adding to capital costs.

Capacity

The timetable to be enacted on the Chat Moss line after the completion of the Northern Hub infrastructure enhancements is still to be finalised and could yet take a form that is different from that provided by Network Rail for this study. This state of fluidity of the future timetable is to be expected at this stage in the planning for Northern Hub. Thus, it remains possible any workable solutions that may be found in this study for introducing services to Leigh could be invalidated by future changes to the post-Northern Hub train plan. Any future changes in train plan will need to be reviewed to verify whether an additional Leigh service can be maintained. Alternatively agreement would be needed with Network Rail to endeavour to maintain timetable space for such a service in future alterations to the overall timetable.

Passenger Franchise Operations

The future shape of passenger franchising is expected to perpetuate the existing single regional franchise model, albeit there could be some minor changes to the structure. The current Northern Rail franchise was let with no provision for additional capacity or services. In spite of this there has been significant growth on the north of England's regional rail network. Some success has been achieved in obtaining additional rolling stock and improving capacity at peak times, but problems still remain. Any future franchise is likely to need to tackle this problem as a priority, which may leave little scope for adding completely new services to the network. The best chance for Leigh to regain a rail service could be if the requirement is built in to the future franchise specification; if it is not then its achievement may be subject to resource constraints created by the specification that the future franchise operator works to.

7.3 Funding Options

Funding of transport infrastructure in the current fiscal constraints of the economy is inevitably problematic. The McNulty report highlighted the need for increased

efficiency in rail operation, and recent sounding from DfT has highlighted the need for the railways to pay for themselves. DfT speakers at the recent West of England Rail Conference emphasised that rail investment is still on the table, but that schemes need to make a positive contribution to the operational efficiency of the railway in financial as well as economic terms. In other words, we need to see investment that can cover its operational costs through increased revenue.

The analysis undertaken for the Leigh rail options highlight that the revenue case for schemes is limited. Setting that to one side for a moment however, the rest of this section will consider what the potential funding routes are, and what the issues surrounding them may be. In all cases though we would need to convince DfT and ORR as overseers of franchise costs that the scheme options would not have a negative impact on the wider rail industry revenue.

- **Major Scheme Business Case DfT –** There is unlikely to be any new money through the MSBC route until at least 2015. Schemes typically require a BCR in excess of 2.0, and clarity on the need for ongoing revenue support as noted above. This latter point would seem to be a serious issue for the success with MSBC.

- **Network Rail Funding** – Network rail set out their network development aspirations through the RUS and the Initial Industry Plan (IIP), these aspirations are then confirmed in the sense of what the Government wishes to buy by way of the rail industry through the HLOS. In effect, there is a circular argument here – a scheme needs to break into the specification of what NR or DfT wish before having the potential to become included. At present the Leigh options are not part of this argument for the region and would need to become so in order to get funding through the NR control period route.

- **Other Government Funds – LSTF / RGF –** From time to time central government sets a policy agenda and allocates funds in support of that. Current focus has been on projects (transport and non-transport) in support of increases in economic productivity, and that unlock employment directly. The funds typically set guidelines around which scheme objectives need to be framed. A scheme such as Leigh would need to have a strong case around the potential to unlock work opportunities, which seems unlikely, or that demonstrates productivity gains, which is an option given the penetration of the options into City Centre Manchester.

- **Developer contributions - S106 etc –** Section 2 of this report highlights areas of proposed development in the study catchment. These proposals provide a useful source of additional demand for the scheme. Where transport infrastructure can be shown to alleviate some of the traffic issues surrounding a new development, there is scope to seek funds from the developer in support. The key issue with the proposals presented is that in the vast majority of cases, the S106 deals have already been achieved. Therefore, unless further development could be unlocked by the transport scheme, this source would seem limited.

- **Regional funding – prudential borrowing / regional funding pot** – The final potential source of funds is from regional government, either through

prudential borrowing against future income streams from the railway, or to directly tap into the Greater Manchester transport fund. For prudential borrowing it would seem sensible that the local authorities are clear that future revenues would be sufficient to cover their investment. There are examples of new stations being developed by accumulating station access charges and P&R revenue and paying it to the local authority as the operator of the site - these streams of revenue being sufficient to cover the construction and operating costs of the scheme. For Leigh, the sums involved would seem sufficient to suggest the lower cost new station options could be funded in this manner – however experience has shown that the DfT are still keen that the revenue impact on the railway as a whole is cost neutral at worst.

8 Benchmarking

8.1 Introduction

This Chapter of the Report summarises the benchmarking exercise on the demand, revenue and benefit forecasts of the preferred options accessed. The exercise is to demonstrate the robustness of the various forecasts against existing station characteristics and behaviour.

8.2 Parallel Stations

Two parallel stations were identified, namely Horwich Parkway and Lea Green. NRTS data requested for these stations has enabled the identification of key characteristics.

Horwich Parkway

Horwich Parkway is located on the Bolton – Preston line and is close to the M61 Junction 6. It has a car park of 151 spaces for which there is no charge for rail users. The characteristics of the station are shown in Tables 8.1 to 8.2, whilst Figure 8.1 illustrates the catchment of rail users at Horwich Parkway who have accessed the station by either driving or being a passenger in a private car.

Table 8.1: Mode of Travel used to Access Horwich Parkway

Access Mode	Total Rail Demand – Boarders	% Total
Car Driver	208	51%
Car Passenger	35	8%
PT	20	5%
Other	145	36%
Total	**408**	**100%**

Table 8.2: Horwich Parkway: Journey Purpose and Time of Travel (%)

Journey Purpose	AM Peak	Inter Peak	PM Peak	Evening	Total
Home	2%	11%	10%	3%	**26%**
Leisure	1%	6%	0%	0%	**7%**
Normal Workplace	46%	2%	0%	0%	**48%**
Other Business	8%	0%	0%	0%	**8%**
Education	3%	7%	0%	0%	**10%**
Total	**60%**	**26%**	**10%**	**3%**	**100%**

Lea Green

Lea Green is located in Merseyside, approximately 2km north of M62, Junction 7. It has a car park of 190 spaces for which there is no charge for rail users. The characteristics of the station are shown in Tables 8.3 to 8.4, whilst Figure 8.2 illustrates the catchment of rail users at Lea Green who have accessed the station by either driving or being a passenger in a private car.

Table 8.3: Mode of Travel used to Access Lea Green

Access Mode	Total Rail Demand – Boarders	% Total
Car Driver	182	52%
Car Passenger	66	19%
PT	3	1%
Other	99	28%
Total	**351**	**100%**

Table 8.4: Lea Green: Journey Purpose and Time of Travel (%)

Journey Purpose	AM Peak	Inter Peak	PM Peak	Evening	Total
Home	0%	5%	2%	4%	**11%**
Leisure	2%	24%	2%	0%	**28%**
Normal Workplace	38%	2%	0%	0%	**40%**
Other Business	9%	1%	0%	0%	**10%**
Education	6%	6%	0%	0%	**12%**
Total	**55%**	**38%**	**4%**	**4%**	**100%**

Table 8.5 shows the car and non-car access mode splits for each station option against the results for Horwich and Lea Green. The proportion of demand outbound in the AM peak period (before 10am) as a percentage of all day boardings are shown in Table 8.6.

Table 8.5: Comparison of Mode Access Splits

	Horwich	Lea Green	Option 1	Option 2	Option 3	Option 4	Option 5
Car	59%	71%	46%	41%	45%	55%	41%
PT/Other	41%	29%	54%	59%	55%	45%	59%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Figure 8.1: Horwich Parkway Access by Car Catchment

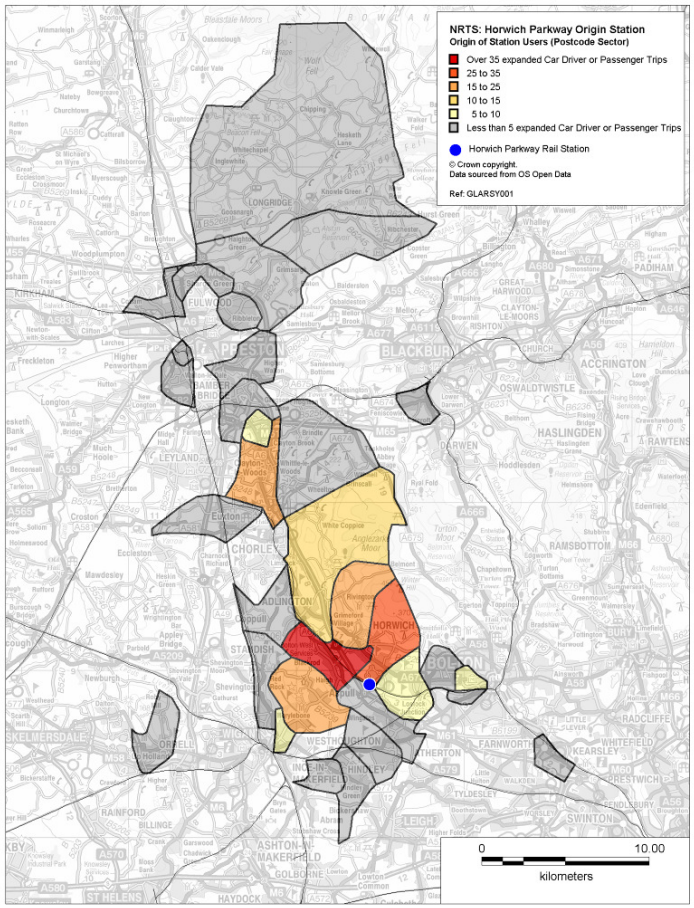
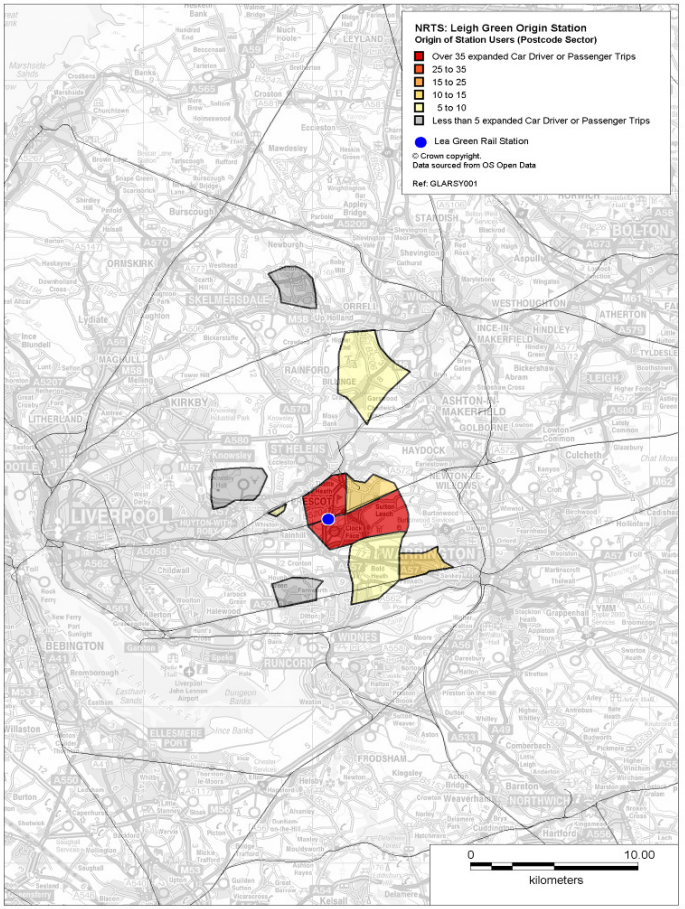


Figure 8.2: Lea Green Access by Car Catchment



Halcrow

Table 8.6: Comparison of Boardings by Time of Day

	Horwich	Lea Green	Option 1	Option 2	Option 3	Option 4	Option 5
AM peak boarding	60%	55%	56%	54%	52%	53%	46%
Rest of the Day	40%	45%	44%	46%	48%	47%	54%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

8.3 Annual Station Demands

The annual station demands for existing Leigh area stations, the two parallel stations and the proposed new stations is shown in Figure 8.2. Note the demands at existing stations have been growth by RUS forecasts to 2016 and do not reflect any abstraction impacts of the possible new stations in the Leigh area.

Figure 8.3: Annual Station Demands

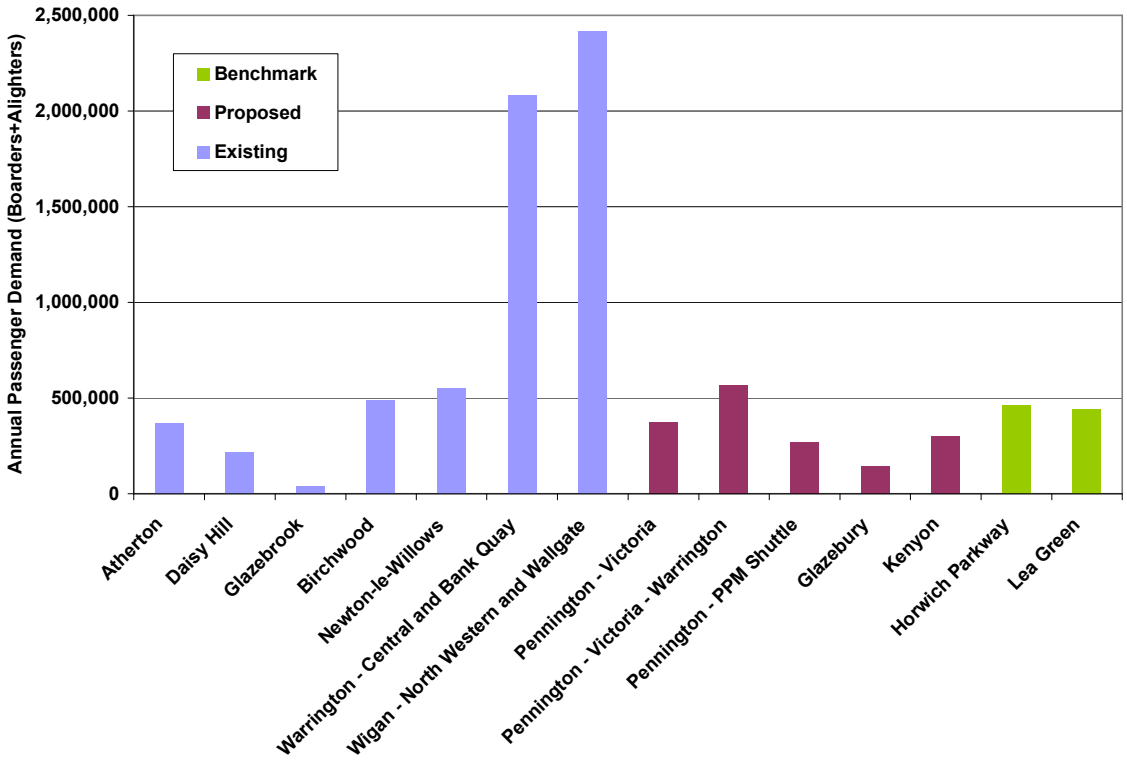
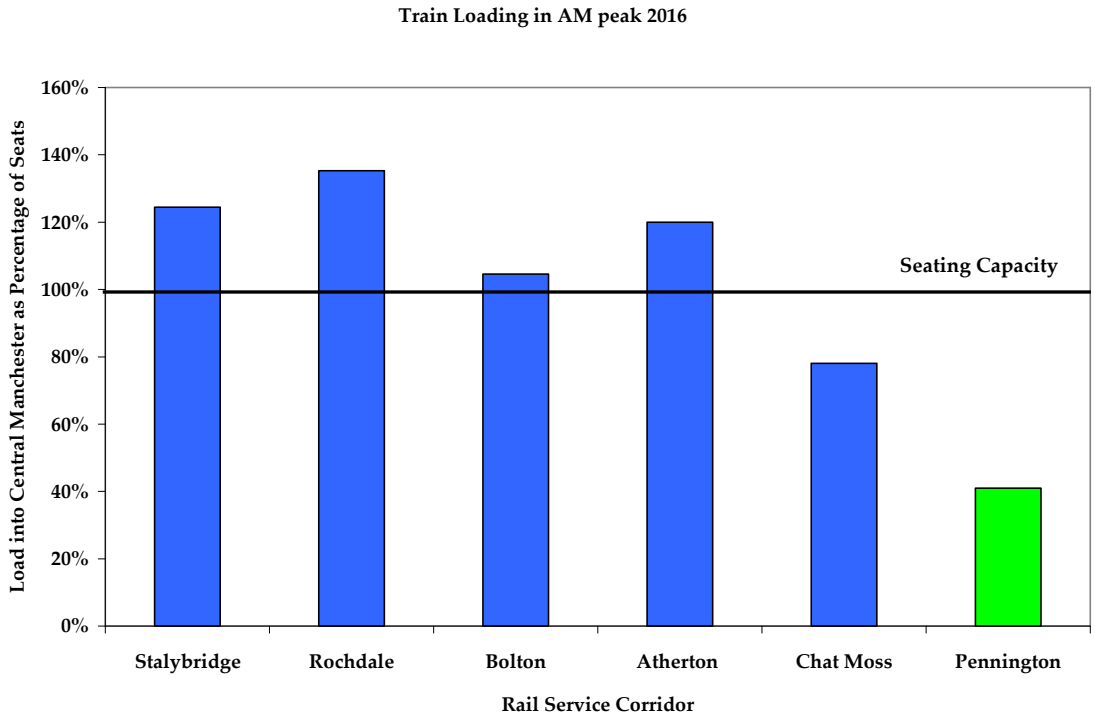


Figure 8.4 shows the AM peak loadings into Central Manchester on the Pennington service in comparison to other lines in North Greater Manchester. The loadings for the Pennington service are low in compared to other lines. As over 90% of the forecast demand for the service comes from just Pennington station, unlike other

lines were demand is from the number of stations, the overall line loadings are low. This low level of occupancy is a measure of the revenue generated by the service against the operating costs, and of the effective use of the rolling stock. Overall, the Pennington service generates low revenue, hence the need for significant operating subsidy, and is less effective use of rolling stock in comparison to other lines in Greater Manchester.

Figure 8.4: Service Loadings into Central Manchester



9 Conclusions and Recommendations

9.1 Conclusions

Study Approach

A range of options were considered and following a sifting exercise, a number of preferred options were identified. The criteria for sifting the preferred options included assessment of rail operational issues (reflecting the proposed Northern Hub changes); policy fit, value for money, deliverability and affordability. This sifting process was based on a standard methodology adopted for many major transport projects seeking funding from central and local government.

Information used for input to the sifting process included data from the client project team on planning issues and proposals, assessment of current travel patterns in the local area, demand at existing local rail stations and evidence of impacts from other new stations.

The preferred options were assessed in detail in terms of operational issues and value for money. The former included discussions with Network Rail to understand the current and projected capacity constraints under the proposals in the Northern Hub Strategy.

The value for money case was based on the guidance for the development and appraisal of major transport schemes, as defined in WebTAG - website for Transport Appraisal Guidance, and GRIP – Governance to Rail Investment Projects.

Rail Operations

The current draft 2018 timetable is very restrictive in terms of opportunities to add trains to serve Leigh. This is not surprising as the timetable has been built to a specification that did not include requirements for Leigh services and so did not leave suitable gaps. That services are feasible at all is encouraging and it may be possible to improve on the options examined herein, if they were considered at the start of a future iteration of the Northern Hub timetable. This would have a positive effect on capital and operational costs. However it may not be possible to improve Leigh services without compromising other aims of the Northern Hub.

Scheme Costs

The costs of the preferred schemes varied considerably, with options to Pennington where new rail infrastructure would be required resulting in a scheme capital cost of £63.1m (2016 prices). For options with a new station on the Chat Moss line, the capital costs were lower at between £17.2m and £11.1 (2016 prices). Operating costs also varied greatly, with the Pennington station options requiring a new service to the network at a cost of between £4.6m and £7.5m (2016 prices) per annum. Stations on the Chat Moss line would be served by additional stops to the existing service, so negligible extra operating costs are incurred apart from station staffing and maintenance costs.

Appraisal of Options

The forecasting of demand and revenue, and the subsequent appraisal of options, has shown the Pennington station options to generate a strong level of demand that is highly comparable to other stations in the area. Levels of passenger benefit are also high, reflecting the travel time savings such options would generate. However, given the significant costs of the schemes, the value for money case is weak, and the economic benefits of options fail to significantly exceed the costs. For a scheme to gain funding approval from the Department for Transport, the benefits must be at least 2.0 times the costs. Hence, the option of a station in Pennington, with rail link, would not pass the basic criteria of the most likely funding agency.

The options for a new station on the Chat Moss line show moderate demands and benefits, especially where access mode improvements are provided through better highway links to the site and a network of feeder bus services. The benefits of these options are more than the costs but less twice times the costs, so such schemes would be seen as low value for money by the Department for possible funding, subject to more detailed development of the scheme and assessment of the proposals. However, the case for the scheme is very sensitive to assumptions on cost and the potential negative impacts to through passenger demand from increased running times in the timetables to accommodate the additional stops. If the latter is included, a station will not show value for money.

9.2 Recommended Strategy

Considering the findings of the study, the following recommendations are made for further action should a decision be made to continue to promote rail improvements in the Leigh area.

Regarding the Pennington station options, the costs of constructing a station and spur, plus the operating costs of the new service are high when compared to the projected benefits. Whilst the forecasting shows strong demand and revenue for a station at Pennington, the net operating subsidy is high, meaning that it is challenging to see how this option could be taken forward solely in a transport context. A wider business case, which included regeneration benefits to Leigh, could be explored in the context of supporting potential future funding bids, but the significant gap between costs and projected benefits of the scheme must be recognised.

The options for a station sited on the Chat Moss railway line station also have overall benefits that are relatively low in relation to the costs, and fall short of current DfT guidance for taking transport schemes forwards.

Recognising the challenges set out in the report, the ability to take any of the options forward would require significant funding given the assessments against DfT business case requirements. The actions below are suggested in order to take advantage of any future funding opportunities:

- **Funding Routes.** There would need to be an investigation of all possible other sources of funding for the scheme, including for example funding

sources related to regeneration programmes, or development-led contributions. The opportunities for new developments around the proposed station sites are however limited by Green Belt and other constraints. This study case has considered only the transport benefits of the proposed options. There may be merit in the scheme being reviewed in terms of the wider economic regeneration benefits (e.g. GVA benefits). Such work was outside the remit of this study.

- **Operational Assessment.** There would need to be a detailed assessment of possible railway timetables (including the impacts to all services in the Chat Moss corridor), and an understanding of any increased travel time to existing passengers through additional stops or reliability issues. Issues need to be assessed given the possible impact of other proposals in the Northern Hub timetables, as the changes in the Leigh Area services may have wider negative consequences.

- **Scheme Costs.** There would need to be detailed surveys and more robust estimates of costs, including capital and operating costs, to ensure all items are covered and risk and contingency are fully reflected.

- **Baseline Demand.** Given the high proportion of existing rail demand forecasted to switch to using the new stations, a better understanding of current travel patterns at these stations is suggested. Also, the forecasting models used for the assessment are very focused on trips within and to Greater Manchester; hence more travel data representing Leigh area trips to Warrington and Merseyside should be collected.

Given the challenges associated with the options set out above there may also be merit in examining options that improve access to existing railway stations.

Technical Appendices

Appendix A - Technical Note on Rail Operations

Appendix B - Technical Note on Census Demand

Appendix C - Technical Note on NRTS Data

Appendix D – Cost Comparison

Appendix E – Double Track Operations

Appendix F – Detailed Cost Tables

The Technical Notes are documents produced during the course of the study and some elements and assumptions may be superseded by information in the Study Report.

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Technical Note – APPENDIX A

Project	TfGM Leigh Area Rail Study	Date	7 November 2011
Note	Rail Operations and Infrastructure	Ref	GLARSY001

1 Reference Data

1.1 The timetable and capacity analysis is based upon the current draft 2018 Northern Hub timetable as encapsulated by:

- Diagram: Northern Hub Possible Pattern: Infrastructure capability test 4A 23/08/2011 (henceforth the 'draft service pattern'
- Timetable: Manchester Hub – Option 2, (henceforth the 'draft timetable')

The Northern Hub timetable is still under development by Network Rail in co-operation with the train operators and PTEs, and will be subject to change. However, the basic timetable requirements for the Chat Moss route is clear, and it is this route which is of primary concern when considering providing rail service for Leigh, and in particular if a station is to be sited in the Pennington area, as it is the nearest main line to which the town can be connected.

2 Summary of Capacity Constraints

2.1 After Northern Hub works are completed the planning headway on the Chat Moss route will be three minutes. This will give a nominal capacity of 20 tph (trains per hour) each way on each line. However the natural variation in day to day performance requires some contingency; this effectively limits the reliably usable capacity to 80% of the nominal figure, in this case giving 16 tph net.

2.2 The draft service pattern shows the following utilisation levels on key sections of the Chat Moss line and relevant other infrastructure as follows:

- 10 tph Liverpool Lime Street – Olive Mount
- 12 tph Olive Mount – Huyton
- 8 tph Huyton – Earlestown
- 10 tph Earlestown – Newton-le-Willows
- 11 tph Newton-le-Willows – Port Salford
- 11 tph Port Salford – Ordsall Lane
- 7 tph Ordsall Lane – Ordsall Chord (south)
- 11 tph Ordsall Chord (south) – Deansgate
- 16 tph Deansgate – Manchester Piccadilly
- 7 tph Ordsall Lane – Salford Central
- 12 tph Salford Central – Manchester Victoria(includes four tph Deansgate – Ordsall Chord – Salford Central)

2.3 From the above we can see that the Deansgate – Piccadilly section is already planned to use post-Northern Hub capacity to the full, so additional trains serving Oxford Road and Piccadilly stations in Manchester is not feasible.

2.4 A significant number of services will cross one another at Ordsall Lane Junction. Therefore, while the new Ordsall Lane chord will enable capacity to be created in the terminus platforms at Piccadilly by routeing trains that currently reverse there via Salford Central and Victoria, it will add trains to the existing Ordsall Lane – Salford Central – Victoria corridor.

2.5 Ordsall Lane Junction has several nodes where movements potentially conflict. The busiest of these appears to be the node where the westbound Chat Moss route crosses the eastbound Bolton line, where 14 movements are expected per hour in two directions. This effectively creates the limit for addition of further trains, and means that only two additional trains per hour are likely ever to be feasible.

2.6 There is also potential for conflicts between trains on the Victoria bound Ordsall chord and trains on the eastbound Bolton line or eastbound Chat Moss line approaching Deansgate and Salford Central respectively.

2.7 This analysis assumes that all junctions are on the flat. However it should be noted that a degree of grade separation at Ordsall Lane has not been ruled out. At this stage the nature, extent or likelihood of any grade separation is not known and therefore it has been assumed that any additional services over and above those provided for by Northern Hub will have to operate within the constraints of flat junctions in the Ordsall Lane area.

2.8 Most Chat Moss services to Victoria use platforms three and 4 at Victoria, however one or two services use the Bolton / Atherton side of the station, platforms 5 and 6. It is not known which platforms the Bolton and Atherton line services use however it is likely that they will predominantly use platforms 5 and six however there will still be some interaction between the two service groups at Deal Street Junction.

2.9 In the draft timetable, off peak services to and from Blackpool North are platformed in platform eight. This is the only service to use this and it implies that platform eight is a west facing bay. Its exact position in the station is unknown.

3 Timetable Data Issues

3.1 The Network Rail draft timetable is incomplete in that the draft service pattern shows three trains per hour per direction traversing Ordsall Lane Junction from Deansgate to Salford Crescent; these services are omitted from the draft timetable. As a result Ordsall Lane junction will be more restricted than indicated and could invalidate identified paths.

3.2 Also omitted from the timetable are Atherton / Bolton line services, whilst these services to not affect the Chat Moss line directly they will use platform capacity at Manchester Victoria and this must be borne in mind when adding extra services.

3.3 The draft service pattern indicates 1 freight path per hour per direction on the Chat Moss line through Victoria. The draft timetable contains two freight services per hour in the west bound direction and only one in the east bound direction. It has been assumed that there are in fact two west bound freight services per hour, the missing service using the appropriate gap in the timetable offset half an hour from the included service.

3.4 There are conflicts inherent in the timetable at Ordsall Lane Junction and Parkside Junction. In addition there are apparent conflicts between services from Victoria to the Chat Moss line, which are timed at Ordsall Lane Junction and Victoria bound services on the Ordsall Chord which are timed at Ordsall Lane East Junction. These conflicts imply that the timetable has not been verified.

4 Pennington – Manchester Victoria Service

4.1 A short branch approximately one and a half miles long would leave the Chat Moss line at an eastwards facing junction approximately seven and a quarter miles west of Patricroft station, known here as Kenyon East Junction. Note: this is approximately half a mile east of the site of former Kenyon Junction which was westward facing.

4.2 Two additional services to Victoria should be feasible over Ordsall Lane Junction. The level of utilisation on plain line sections of the Chat Moss line will be within the 80% value of the lines capacity at 13 tph. Putting an east facing connection with Pennington trains crossing the main line to access the branch, will effectively increase utilisation to 15-16 tph, the robust maximum.

4.3 In the draft timetable two paths per hour have been identified between Kenyon East Junction and Victoria allowing services from Pennington to Victoria, these are shown below in bold in an indicative schedule:

Eastbound	Class	185	**319**	185	350		185	**319**	185	350
	From	LIV	**PEN**	MIA	BPN		LIV	**PEN**	MIA	GLC
	To	SCA	**MCV**	NCL	MCV		SCA	**MCV**	NCL	MAN
	Notes				PEAK?					
Parkside Junction	pass	15			25 ½		45			55 ½
Pennington	dep		**17 ½**					**47 ½**		
Eccles	dep	23 ½	**27 ½**		35 ½		53 ½	**57**		05 ½
Ordsall Lane Junction	pass	28	**32**		40 ½		58	**02**		10 ½
Ordsall Lane East Junction	pass			40 ½					10 ½	
Salford Central	dep	30 ½	**34 ½**	41 ½	45 ½		00 ½	**04 ½**	11 ½	
Victoria	arr	33 ½	**37 ½**	45	48		03 ½	**07 ½**	15	

4.4 Between Victoria and Kenyon East Junction there is no space for valid paths in the draft timetable. The following indicative schedule shows how the best candidate paths can be validated by re-timing surrounding services. See the explanatory notes below as to the required re-timings.

Westbound	Class	175	**319**	185	185		175	**319**	185	185
	From	LDS	**MCV**	LDS	HUL		LDS	**MCV**	LDS	SCA
	To	CTR	**PEN**	MIA	LIV		LLD	**PEN**	MIA	LIV
	Notes	*		+			*		+	
Victoria	dep	21	**24**	26	30		51	**54**	56	00
Salford Central	dep	24	**27**	29	33		54	**57**	59	03
Ordsall Lane East Junction	pass			29 ½	34 ½				59 ½	04 ½
Ordsall Lane Junction	pass	25 ½	**28 ½**				55 ½	**58 ½**		
Eccles	dep	31	**34**		37 ½		01	**04**		07 ½
Pennington	Arr		**45 ½**					**15 ½**		
Parkside Junction	pass	40 ½			46		10 ½			16

*** Departs Victoria 1 minute earlier than in the draft timetable, back on Schedule by Parkside junction**

+ Departs Victoria 1 minute later than in the draft timetable

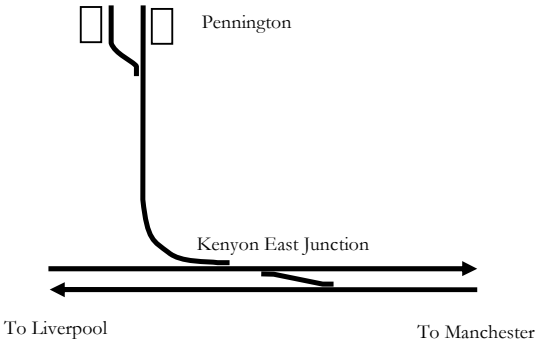
4.5 Timings on the main line section are derived from timings in the draft timetable such that the new services can keep pace with the preceding service. On the branch two and one half minutes have been allowed to travel from Pennington to the junction in either direction. This equates to an average speed of 36 mph.

4.6 The round trip time in the above schedules from Victoria to Pennington, including the likely trip needed to turn back at Victoria via Newton Heath TMD is one hour and 32 minutes and 30 seconds; therefore a single unit can only depart from Victoria every two hours thus requiring four units to cover a two tph service.

4.7 There is no platform capacity on platforms three -six of Victoria station. Only if the putative westward facing bay, platform eight as used by Preston services in the draft timetable, is provided can this service operate and then only once an hour in the off peak.

4.8 There is already a greater number of services proposed to the west of Victoria than to the east therefore the service would likely be a self contained shuttle. It is unlikely there will be other electric services terminating at Victoria this service could interwork with so as to achieve operating economies.

4.9 The following diagram illustrates the minimum infrastructure requirements for this option. It shows a single track branch and a single lead junction



4.10 The indicative schedule above features a 32 minute layover At Pennington, this is enforced by the availability of paths on the Chat Moss line leaving two and a half minutes margin between an arrival and the next departure which is below the four minutes minimum required in 2012 North Western Rules of the Plan (RotP). The consequence is the requirement for two platform faces at Pennington; in the diagram this is shown as two physical platforms but could instead be a single island platform.

4.11 The long layover could be used as a performance buffer, however with the single track arrangement a delayed arrival at Pennington could delay the next outbound service, to take full advantage of the layover in this fashion would require the branch to be double tracked and possibly require a double junction arrangement at Kenyon East.

4.12 It is feasible in the draft timetable to allow the Leeds to Chester services to depart one minute earlier from Victoria, this may not be acceptable as the resultant dwell would breach the minimum dwell value for Victoria which is two minutes in the 2012 RotP.

4.13 Also in the draft timetable it is feasible to allow the Leeds to Manchester Airport trains to depart one minute later from Victoria than in the draft timetable, however this may cause conflicts with services on the Deansgate to Piccadilly corridor. It is unknown at this time whether there would be a conflict and whether it would be resolvable.

4.14 Junction clearances at Kenyon East Junction and Ordsall Lane junction have been checked. All newly introduced junction clearances are three minutes.

4.15 Option Summary:

- Paths have been identified for a two tph service between Victoria and Pennington.
- Some minor re-timing of other services is required in the west bound direction which may result in timetable planning rule violations and conflicts on the Deansgate – Piccadilly corridor.
- Two tph requires three units and crews for a stand alone operation.
- There is no platform capacity on platforms three to six at Victoria even when the trains turn back via Newton Heath TMD. If a west facing bay is provided the service could run once per hour in the off peak.

5 Warrington Bank Quay – Pennington – Victoria Services

5.1 This scenario envisages two additional trains per hour per direction between Warrington Bank Quay and Victoria running via Earlestown and a reversal at Pennington.

5.2 This scenario requires two junctions on the Chat Moss line: Kenyon East Junction facing east, as identified for the Pennington – Victoria option, and a west facing junction at the original site of Kenyon Junction, henceforth known as Kenyon West Junction.

5.3 This option has the advantage of connecting Leigh to the West Coast Main Line at Warrington, as well as to Manchester. It could also relieve capacity on the Chester and North Wales services.

5.4 On the West Coast Main Line, four minute headways, a four track main line and only two tph running between Bank Quay and Earlestown with two tph express passenger and some freight trains on the West Coast Main Line means that additional trains here would not be a major issue.

5.5 However eastbound trains would have to cross the westbound Chat Moss line at Earlestown and westbound trains would have to cross the eastbound Chat Moss line twice at the Kenyon junctions. However, this still brings capacity utilisation up towards the limits at an equivalent of 15-16 tph rather than beyond it.

5.6 Two paths per hour per direction have been identified between Pennington and Warrington Bank Quay; the previously identified paths between Pennington and Victoria are re-used. The following table shows an indicative eastbound schedule. Note that arrivals are three minutes after departures necessitating a 27 minute layover in the station.

Eastbound	Class	185	**319**	185	185	**319**	FRT	185		185	**319**	185	185	**319**	FRT	185
	From	LIV	**WBQ**	MIA	LIV	**WBQ**	ARP	MIA		LIV	**WBQ**	MIA	LIV	**WBQ**	ARP	MIA
	To	LDS	**MCV**	LDS	SCA	**MCV**	IMM	NCL		LDS	**MCV**	LDS	HUL	**MCV**	IMM	MBR
	notes															
Warrington Bank Quay	dep		**59**								**29**					
Earlestown	dep	02	**07**		14		17			32	**37**		44		47	
Newton-le-Willows	dep	04	**09½**		14½		19½			34	**39 ½**		44½		49½	
Parkside Junction	pass	05½	**11**		15		22			35½	**41**		45		52	
Pennington	arr		**15**			**<B**					**45**			**<A**		
Pennington	dep		**A>**			**12**					**B>**			**42**		
Eccles	dep	15½			23½	**27½**	32			45½			53½	**57½**	02	
Ordsall Lane Junction	pass	20½			28	**32**	37½			50½			58	**02**	07½	
Ordsall Lane East Junction	pass			25½				40½				55½				10½
Salford Central	dep	23		27½	30½	**34½**	39½	41½		53		57½	00½	**04½**	09½	11½
Victoria	arr	25		29½	33½	**36½**	42½	45		55		59½	03½	**06½**	12½	14½

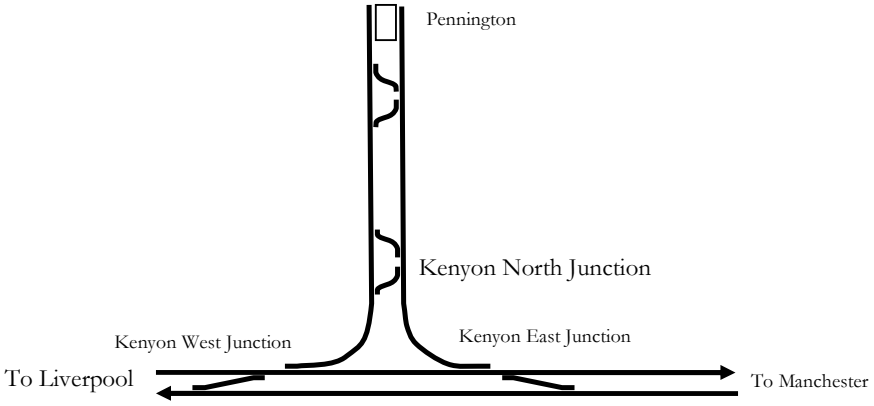
5.7 The following table shows an indicative westbound schedule. As for the Pennington only option the new paths require re-timing of some services, see the notes following the table.

Westbound	Class	175	**319**	185	185	319	FRT	**319**	185		175	**319**	185	185	319	FRT	**319**	185
	From	LDS	**MCV**	LDS	HUL	MIA	IMM	**MCV**	LDS		LDS	**MCV**	LDS	SCA	MIA	IMM	**MCV**	LDS
	To	CTR	**WBQ**	MIA	LIV	LIV	ARP	**WBQ**	LIV		LLD	**PEN**	MIA	LIV	LIV	ARP	**WBQ**	LIV
	notes	-1		+1							-1		+1					
Victoria	dep	21	**24**	26	30		33		45		51	**54**	56	00		03		15
Salford Central	dep	24	**27**	29	33		36		48		54	**57**	59	03		06		18
Ordsall Lane East Junction	pass			29½	34½								59½	04½				
Ordsall Lane Junction	pass	25½	**28½**			37½	40½		49½		55½	**58½**			07½	10½		19½
Eccles	dep	31	**34**		37½	41½	44		52½		01	**04**		07½	11½	14		22½
Pennington	arr		**48**					**<<<**				**18**					**<<<**	
Pennington	dep		**>>>**					**52**				**>>>**					**22**	
Parkside Junction	pass	39½			46	50		**56**	01		09½			16	20		**26**	31
Newton-le-Willows	dep	42½			47	51½	55	**58½**	03						21½	25	**28½**	33
Earlestown	dep	46			48	54½	00	**03**	04						24½	29	**33**	34
Warrington Bank Quay	arr	?						**10**									**40**	

*** Departs Victoria 1 minute earlier than in the draft timetable, back on Schedule by Parkside junction**

+ Departs Victoria 1 minute later than in the draft timetable

5.8 The following diagram illustrates the minimum infrastructure requirements for this option. It shows a double track branch between Pennington and Kenyon North Junction where single track chords diverged to single lead junctions at Kenyon East and Kenyon West. The double track arrangement is imposed by the paths available on the main line; with favourable paths the branch could be singled, saving five turnouts.



5.9 The reversal times for eastbound services of 27 minutes is imposed by the availability of paths on the main line and the need for a significant amount of pathing on the branch to avoid platform end conflicts.

5.10 Again running times on the main line between Victoria and Earlestown are such that the new service can keep pace with the preceding service. Between Earlestown and Warrington Bank Quay timings taken from the current working timetable (December 2011) have been used, these are for class 175 DMUs and it is assumed that the class 319 can match these. On the branch two and a half minutes are allowed for the run between the Chat Moss line and Pennington. Half a minute is provided between each Kenyon Junction.

5.11 The round trip time from Victoria to Warrington and back, including the likely necessity to shunt between platforms via Newton Heath TMD is two hours 32 minutes and 30 seconds. A single unit can make a departure from Victoria every three hours thus requiring a total of six units to cover a two tph service.

5.12 Junction clearances have been checked at Earlestown, Parkside Junction, Kenyon Junctions and Ordsall Lane Junction.

5.13 Victoria to Warrington Bank Quay services cross the east bound Chat Moss two and a half minutes in front of a Glasgow Central to Victoria and Blackpool North to Victoria service in each hour. All other newly introduced junction clearances are at least three minutes for Kenyon junctions and at least the current junction margins for other locations.

5.14 There is no platform capacity on platforms three -six of Victoria station. Only if the putative westward facing bay is provided can this service operate and then only at two tph off peak.

5.15 Option Summary:

- Paths have been identified for a service that runs between Victoria and Warrington Bank Quay via a reversal at Pennington.
- Some minor re-timing of other services is required in the west bound direction which may result in timetable planning rule violations and conflicts on the Deansgate – Piccadilly corridor.
- Journey time in the west bound direction is 46 minutes
- Journey time in the east bound direction is one hour and seven minutes and 30 seconds.
- The turn around time at Pennington in the west bound direction is four minutes
- The turn around time in the eastbound direction is excessive at 32½ minutes.
- Some minor re-timing is required of other services.
- Six units and crews would be required for a stand alone operation.
- Not an attractive through service in the eastbound direction.

6 Additional Through Liverpool – Victoria Services

6.1 This scenario envisages two additional trains per hour calling at a station located on the Chat Moss Line between the site of former Kenyon Junction and the former site of Glazebury station.

6.2 This option was ruled out at an early stage for the same reasons as the additional Liverpool – Pennington – Victoria services see section **Error! Reference source not found.**.

7 Additional through Warrington Bank Quay to Victoria service

7.1 This scenario envisages two additional trains per hour calling at a station located on the Chat Moss Line between the site of former Kenyon Junction and the former site of Glazebury station.

7.2 In the draft timetable there is no space for these paths through the Chat Moss corridor there are gaps at either end but not so that they form a continuous space thus this option was ruled out at an early stage

8 Additional Calls in Existing Chat Moss services

8.1 This would provide a two tph service per direction between a new station on the Chat Moss line and Manchester Victoria or Piccadilly.

8.2 The new station would be positioned between the former site of Kenyon Junction and the former site of Glazebury station (inclusive).

8.3 The fast Manchester – Liverpool and Manchester – Scotland services cannot be stopped as they are specified with constrained journey times.

8.4 Services that can potentially serve a new Chat Moss station are:

- Leeds – Victoria – Chester and beyond.
- Slow Manchester Airport – Liverpool
- Peak only, hourly, Preston and beyond to Victoria
- Semi-fast Leeds – Victoria – Liverpool

8.5 To stop a train at a station, dwell and then re-start incurs a penalty of between two and three minutes over the time taken to simply pass through the station at speed. Thus an additional stop in a service will extend the journey time by the same amount and require it to either run early before the stop or run later after the stop or some of both.

8.6 A surplus in headway around the candidate service of two and a half to three minutes is required i.e. the candidate service must run in excess of the minimum headway behind the train in front and the following service must run in excess of the minimum headway behind the candidate train such that the sum of the excesses can accommodate the time penalty incurred by stopping the candidate service.

8.7 If sufficient time around the train is not available then surrounding services may be re-timed to create that time if they in turn have excess time to move into.

8.8 Re-timing a train over a junction may result in a junction conflict with other services running in the opposite direction.

8.9 Westbound services to Chester and beyond can accommodate an extra stop at a Chat Moss station twice every hour; they can pass Parkside Junction tow and a half minutes later than scheduled and maintain the minimum headway in front of the following fast service to Liverpool, to maintain this headway the stop at Newton-le-Willows must be removed so that the arrival times at Earlestown of the Chester bound services is maintained.

8.10 Eastbound services from Chester and beyond can accommodate an extra stop at a Chat Moss station once an hour in the off peak: Alternate services cannot pass Parkside junction any earlier as they follow a constraining Scotland service, in the other half an hour the same path is occupied by a peak only Preston and beyond service which could be timed to pass Parkside junction earlier than proposed and thus make space for an extra stop in the Chester service. Note: Re-timing the Preston service would be subject to the constraints on the remainder of its route, principally the West Coast Main Line.

8.11 Westbound slow services to Liverpool can accommodate an extra stop at a Chat Moss station twice per hour; this requires the re-timing of the following Immingham – Arpley freight and Liverpool semi-fast service.

8.12 Eastbound slow services from Liverpool can accommodate an extra stop at a Chat Moss station twice per hour; this requires the re-timing of a Chester service earlier by half a minute at Earlestown and a two minute later arrival into Piccadilly.

8.13 Westbound semi-fast services to Liverpool can only accommodate an extra stop at a Chat Moss station once an hour; alternate services are constrained by a following Scotland service, in the other half of the hour the path is occupied by a Preston service which along with the following Immingham to Arpley freight and slow Liverpool service must be retimed.

8.14 Eastbound semi-fast services from Liverpool can accommodate an extra stop at a Chat Moss station twice an hour by removing two minutes of pathing allowance from the schedule and arriving one minute later into Victoria.

8.15 Westbound, hourly, peak hour only, Preston services can accommodate a stop at a Chat Moss station subject to the constraints of the rest of their route beyond Parkside Junction, principally the West Coast Main Line where to the north of Preston the mix of express and heavy freight trains means there is little timetable flexibility.

8.16 Eastbound, hourly, peak hour only, services from Preston can accommodate a stop at a Chat Moss station by joining the Chat Moss line at Parkside junction three minutes earlier; this is again subject to constraints on the West Coast Main Line.

8.17 Without access to any provisional rolling stock diagrams (and we understand none have been drawn up) it is not possible to assess the impact on vehicle requirements.

9 Impact of new and altered services on access to the Port Salford development

9.1 It has been assumed that the line to the Port Salford development makes a flat triangular junction with the Chat Moss line between the over bridges carrying the M62 and M60 motorways. This places the junction approximately half way between Eccles station and Astley Signal box.

9.2 There is potential for conflicts at this junction between freights on the half hourly, eastbound Arpley to Immingham paths leaving or joining the Chat Moss and westbound services on the Chat Moss line.

9.3 In the draft timetable as it stands it is estimated that an eastbound freight would cross the west bound Chat Moss line four minutes in front of Chester services and two minutes after the Scotland or Preston service, depending on the half hour.

9.4 In the Victoria – Pennington and Victoria – Pennington – Warrington option it was assumed that the Chester service would run one minute earlier reducing the margin with eastbound freights at the Port Salford junction to three minutes which is still acceptable.

In these options the Victoria to Pennington path follows the Chester service and will not conflict with the eastbound freight.

9.5 When inserting an extra stop into westbound Chester services, these will pass the junction site no more than one minute earlier than currently scheduled, maintaining a three minute junction margin.

9.6 Inserting an extra stop into the westbound slow Liverpool services does not affect the junction clearance of eastbound freight services.

9.7 Although inserting an extra stop into the westbound semi-fast Liverpool services requires re-timing of the Victoria – Blackpool North, peak, service it would not affect the junction margins at the freight junction.

9.8 If the Victoria to Blackpool North peak service were re-timed to accommodate an extra stop it would not affect the junction clearance at the freight junction.

9.9 The eastbound freight path follows the fast Liverpool – Victoria service on the Chat Moss and is constrained by it so that it cannot run earlier, none of the options considered alter its schedule.

10 Potential Benefits of loops at a Chat Moss line station

10.1 The provision of loops at a Chat Moss line station with the platforms situated on them would mitigate the lack of contiguous paths through the corridor by providing an opportunity for non stopping services to overtake.

10.2 The main line paths identified for the Victoria – Pennington – Warrington option could instead of reversing at Pennington could be linked at the Chat Moss station. The services that previously prevented a new through service would overtake whilst the new services waited in the loops. The new service could then continue on its journey.

10.3 The journey time from Victoria to Warrington would be reduced by half an hour in the above scenario as an arrival at the Chat Moss station would connect to the next path rather than the next but one path.

10.4 The dwells would be approximately 10 minutes in the westbound direction and 5 in the eastbound direction.

10.5 If such a station were included in the planning process for the next iteration of the draft timetable it may be that the added flexibility it would provide could result in quicker end to end journey times with a consequent fall in operating costs.

11 Conclusions

11.1 Analysis of various options against the draft timetable shows that the addition of a new service or additional stops in existing services is constrained by:

- the mix of fast and stopping passenger services and freight services on the Chat Moss Line
- the immovable express services on the Chat Moss Line
- the inflexibility of some WCML timings of services that use the Chat Moss Line-

11.2 The draft service pattern shows that the Deansgate – Piccadilly corridor is already at capacity ruling out services to and from Piccadilly or Oxford Road.

11.3 The draft timetable reveals that much of the increase in capacity provided by four-tracking between Huyton Junction and Roby is utilised by fast and semi-fast Manchester – Liverpool services overtaking slow Wigan – Liverpool and slow Manchester Liverpool services, this in conjunction with the provision of freight paths in each direction between Manchester Victoria and Earlestown and Earlestown and Olive Mount Junction effectively rules out additional direct services between Manchester and Liverpool or Manchester and Warrington Bank Quay.

11.4 Potential Paths have been identified for the inclusion in the draft timetable of two trains per hour per direction between Manchester Victoria and a new Pennington station situated on a branch. These paths are subject to the acceptance of minor re-timings to two services per westbound path which may not be possible.

11.5 Crucially there is no capacity at Victoria on platforms three - six for these paths. If a single west facing bay is provided, as implied by the draft timetable then this service can operate as two tph in the off peak and 1 tph in the peak. two tph in the peak would require another west facing bay at Victoria which may or may not be possible.

11.6 The Victoria – Pennington paths do not provide for optimal use of stock or crews due to the long layover at Pennington they enforce. Another consequence of the long layover is the need for two platform faces at Pennington, although the branch and junction on the Chat Moss line needs only to be single track.

11.7 Additional paths from Warrington Bank Quay to Pennington have been identified enabling a Warrington Bank Quay – Victoria service via a reversal at Pennington. Unfortunately the paths are not favourably distributed and result in an extended dwell time at Pennington in the westbound direction of approximately ~30 minutes. This results in extended journey times of over an hour and does not provide attractive through journeys. The constrained nature of the paths requires two platform faces and a double track branch, although both junctions on the Chat Moss line are single lead.

11.8 Again platform capacity at Victoria is an issue see section 11.5 above.

11.9 Of the services that it is permissible to re-time it is possible to insert additional stops at a Chat Moss station twice an hour into in to:

- Westbound Chester services
- East and Westbound slow Liverpool services
- Eastbound semi fast Liverpool services

Of the services that it is permissible to re-time it is possible to insert an additional stop at a Chat Moss station once per hour in the off peak in to:

- Eastbound Chester services
- Westbound semi-fast services

11.10 Additionally the hourly peak only Preston services can accommodate an additional stop at a Chat Moss station in both directions.

11.11 To attempt to improve the viability of each of the three options considered in detail here it would be necessary to include them as a requirement in future iterations of the Northern Hub timetable, a better distribution of paths for the additional service options would improve the utilisation of stock and crews and in the case of the Warrington Bank Quay service would improve the attractiveness of through journeys.

11.12 None of the developed options prejudice access to the proposed Port Salford development from the Chat Moss line.

11.13 'Off line' loop platforms would allow the partial paths found at each end of the Victoria – Parkside corridor to be joined up with better eastbound journey times and stock utilisation than for the Victoria – Pennington – Warrington option.

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Technical note – APPENDIX B

Project	Leigh Area Rail Study	**Date**	7th October 2011
Note	Census 2001 Data Analysis	**Ref**	GLARSY

1 Introduction

1.1 The purpose of this technical note is to present the analysis of the population of the Leigh study area undertaken for the Leigh Area Rail Study and outline any assumptions made in producing it. Station usage and mode share data is also included within the analysis.

1.2 There are eight tables and two figures of interest in this technical note which were first presented at the progress meeting for the study on the 30th September 2011. The meeting was held at the Life Centre in Wigan and was attended by representatives of TfGM, Wigan Council, Warrington Council and Halcrow.

1.3 Responding to the request from TfGM and Wigan Council at the meeting, Halcrow has provided some additional analysis in the tables and figures to extend the coverage of the area of analysis to Runcorn, Salford Quays/Trafford and Warrington.

1.4 The technical note is divided into four sections, which are as follows:

- Introduction
- Catchment Area
- Mode Share
- Station Usage

2 Catchment Area

2.1 The number of people living within a likely catchment of each of the new station options has been established, alongside how many of these people work within the likely catchment of a station that could be served by a new Leigh station. The figures have been taken from Census 2001 journey to work data and assumes the following:

- Population lives within a likely catchment area of a proposed Leigh station (e.g. Glazebury)

- Population must also travel to work at a destination which is within a 1km radius of possible end stations (e.g. Newton-le-Willows), with the exception of Liverpool and Manchester City Centres which have been expanded to take into account better modes of interchange e.g. Metrolink.
- The population is split into four distance bands from each option.
- Regardless of mode of transport used at present, the population is all thought to be a potential train user.
- The figures represent historic journeys to work and should not be mistaken as a demand forecast. However, it may be useful in understanding future demand and benefits derived for the study.
- The total population is the same for each option as the population is assumed to live within the same overall study area boundary. Only the figures within each distance band will change.

2.2 Tables 2.1 – 2.4 demonstrate the population by distance of living from each proposed station option and who work within the catchment of a possible station served by a new station at Leigh. This is assumed to form a potential market for rail if the station was to be constructed.

Table 2.1 - Population Catchment Working Outside of Leigh Area: Pennington Station (Journeys to Work per Day)

Distance From Station	All	Home	Underground	Train	Bus	Taxi	Car Driver	Car Passenger	Motorcycle	Bicycle	Walk	Other
Less than 1km	167	0	0	15	15	0	134	3	0	0	0	0
Between 1km and 2km	436	0	0	24	75	0	280	45	6	6	0	0
Between 2km and 5km	2,077	0	3	153	189	0	1,561	123	30	6	12	0
Greater than 5km	115	0	0	6	12	0	88	3	6	0	0	0
Total	**2,795**	**0**	**3**	**198**	**291**	**0**	**2,063**	**174**	**42**	**12**	**12**	**0**

Table 2.2 - Population Catchment Working Outside of Leigh Area: East of Kenyon Station (Journeys to Work per Day)

Distance From Station	All	Home	Underground	Train	Bus	Taxi	Car Driver	Car Passenger	Motorcycle	Bicycle	Walk	Other
Less than 1km	46	0	0	0	0	0	43	3	0	0	0	0
Between 1km and 2km	563	0	3	63	51	0	416	12	12	3	3	0
Between 2km and 5km	1,638	0	0	99	159	0	1,224	120	18	9	9	0
Greater than 5km	548	0	0	36	81	0	380	39	12	0	0	0
Total	**2,795**	**0**	**3**	**198**	**291**	**0**	**2,063**	**174**	**42**	**12**	**12**	**0**

Table 2.3 - Population Catchment Working Outside of Leigh Area: North of Culcheth Station (Journeys to Work per Day)

Distance From Station	All	Home	Underground	Train	Bus	Taxi	Car Driver	Car Passenger	Motorcycle	Bicycle	Walk	Other
Less than 1km	100	0	3	6	9	0	76	3	3	0	0	0
Between 1km and 2km	435	0	0	45	30	0	327	24	0	3	6	0
Between 2km and 5km	1,975	0	0	123	225	0	1,459	120	33	9	6	0

Greater than 5km	285	0	0	24	27	0	201	27	6	0	0	0
Total	**2,795**	**0**	**3**	**198**	**291**	**0**	**2,063**	**174**	**42**	**12**	**12**	**0**

Table 2.4 - Population Catchment Working Outside of Leigh Area: Glazebury Station (Journeys to Work per Day)

Distance From Station	All	Home	Underground	Train	Bus	Taxi	Car Driver	Car Passenger	Motorcycle	Bicycle	Walk	Other
Less than 1km	51	0	0	6	3	0	39	0	3	0	0	0
Between 1km and 2km	49	0	0	0	3	0	43	3	0	0	0	0
Between 2km and 5km	1,742	0	3	114	228	0	1,229	126	21	12	9	0
Greater than 5km	953	0	0	78	57	0	752	45	18	0	3	0
Total	**2,795**	**0**	**3**	**198**	**291**	**0**	**2,063**	**174**	**42**	**12**	**12**	**0**

2.3 It is clear that there are a low number of trips in the journey to work data from the Leigh study area to a destination which may be served by a future rail service. Particularly, there are very few rail trips, which is perhaps understandable given that Leigh does not currently have a rail station and therefore using rail would require an interchange journey to another station outside of the town.

2.4 Additionally, the levels of people living within a typical walking catchment (assumed to be 1km in this analysis) of the proposed options are very low and emphasise the need for provision of either park & ride or public transport interchange.

2.5 Table 2.5 demonstrates the population within the Leigh study area in terms of

- Working within the potential catchment of a served rail station outside of the Leigh study area (Destination: Catchment)
- Working within the Leigh study area (Destination: Leigh)
- All work trips (Destination: All).

Table 2.5: Comparison of Leigh Journey to Work Trip Destinations (Journeys to Work per Day)

Origin	Destination	Total	Home	Underground	Train	Bus	Taxi	Car Driver	Car Passenger	Motorcycle	Bicycle	Walk	Other
Leigh	Catchment	**2,795**	0	3	198	291	0	2,063	174	42	12	12	0
Leigh	Leigh	**16,506**	2,840	3	24	1,098	90	7,037	1,393	87	509	3,398	27
Leigh	All	**36,629**	2,840	9	354	2,466	135	23,113	2,773	312	746	3,797	84

2.6 The total number of journey to work trips from the Leigh study area to possible stations served is fairly low in comparison to the overall numbers of journey to work trips. The proportion is 7.6% (2,795 people). A total of 45.1% (16,506 people) of journey to work trips are internal to the Leigh study area and are unlikely to use a new station at Leigh in anything more than small numbers. The remaining 17,328 work in areas that are unlikely to be served by a new rail station at Leigh.

3 Mode Share

3.1 The destination of the journey to work trips from the Leigh study area has been analysed. The mode share for these trips has also been summarised. The assumptions used are the same as referenced in Section 2: Catchment Area.

3.2 In order to provide a comparison against regional trends, the mode shares for Wigan and Greater Manchester overall have also been analysed again using Census 2001 data.

3.3 Mode share is presented in table 2.6, underneath the Census 2001 journey to work trips by destinations that are likely to be served by a Leigh station. The destinations are presented in nine groupings e.g. Central Manchester.

Table 3.1: Destination of Leigh Study Area Trips

To	All	Home	Underground	Train	Bus	Taxi	Car Driver	Car Passenger	Motorcycle	Bicycle	Walk	Other
Central Liverpool	174	0	0	15	3	0	147	6	3	0	0	0
Central Manchester	1,253	0	0	180	210	0	749	87	18	3	6	0
Eccles	196	0	0	0	0	0	181	15	0	0	0	0
East Liverpool	30	0	0	0	0	0	30	0	0	0	0	0
Newton-le-Willows	228	0	0	0	9	0	192	18	0	6	3	0
Runcorn	21	0	0	0	0	0	21	0	0	0	0	0
v	195	0	0	0	6	0	174	12	3	0	0	0
St. Helens	75	0	0	0	0	0	69	6	0	0	0	0
Warrington	623	0	3	3	63	0	500	30	18	3	3	0
Total	**2,795**	**0**	**3**	**198**	**291**	**0**	**2,063**	**174**	**42**	**12**	**12**	**0**
Mode Share	**100.0%**	**0.0%**	**0.1%**	**7.1%**	**10.4%**	**0.0%**	**73.8%**	**6.2%**	**1.5%**	**0.4%**	**0.4%**	**0.0%**

3.4 The majority of trips from the Leigh study area are travelling to Central Manchester and Warrington with a total of 1,876, which is 67.1% of the total demand travelling from the catchment and to the potential destinations served by rail. Overall mode share is heavily skewed towards car, with 80% relying on car to travel to work – 73.8% car driver plus 6.2% car passenger.

3.5 The mode share of car relative to public transport to various wards served by a potential station in Leigh is summarised in figures 3.1 – 3.2. Figure 3.1 demonstrates the absolute values of car and public transport numbers of journeys to work, whereas figure 3.2 provides the percentage splits of car and public transport journeys to work. Each of the two figures provides the information at ward level to improve presentation.

Figure 3.1: Absolute Trips from Leigh Study Area to Destinations Potentially Served by Rail (Journeys to Work by Ward)

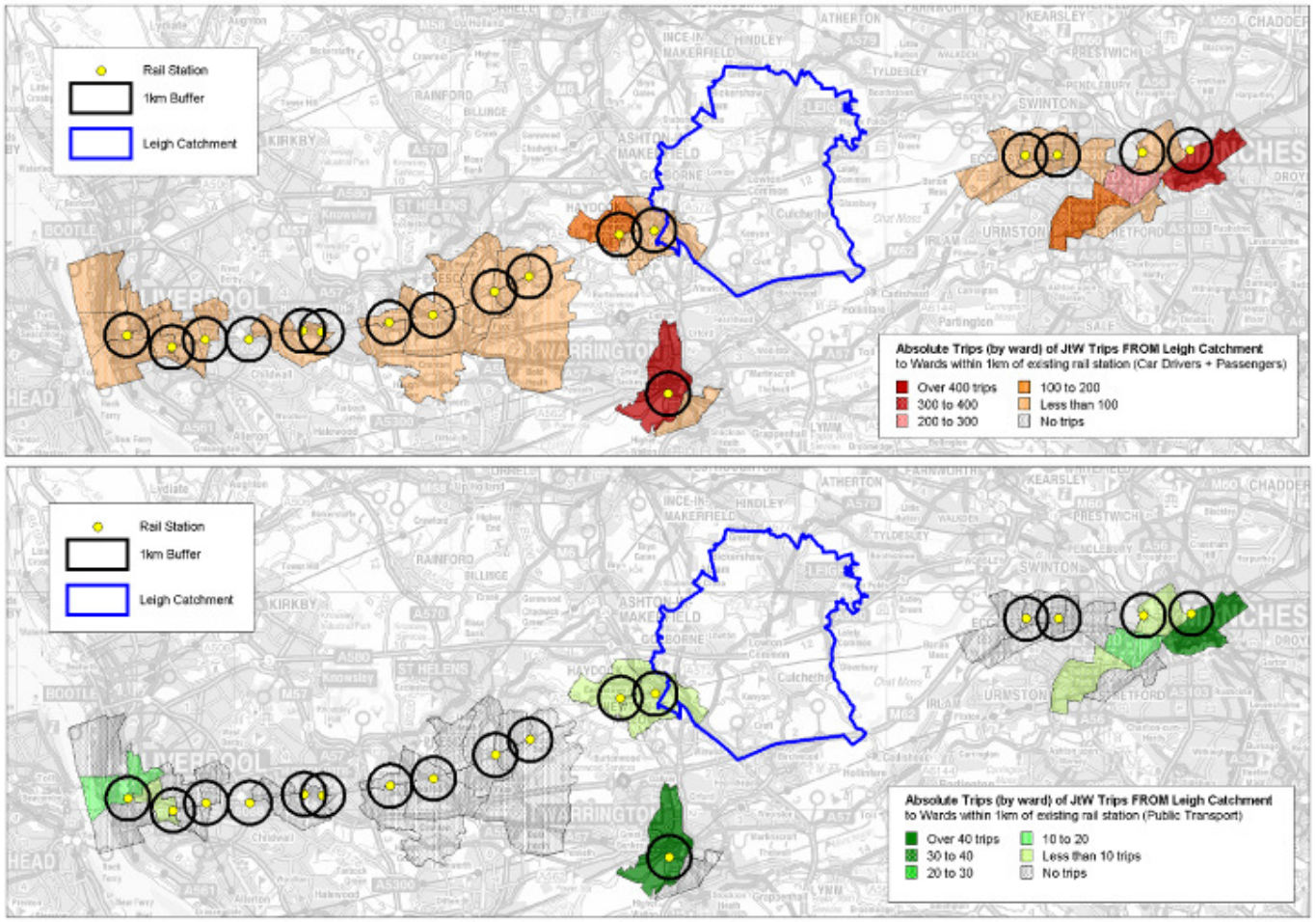
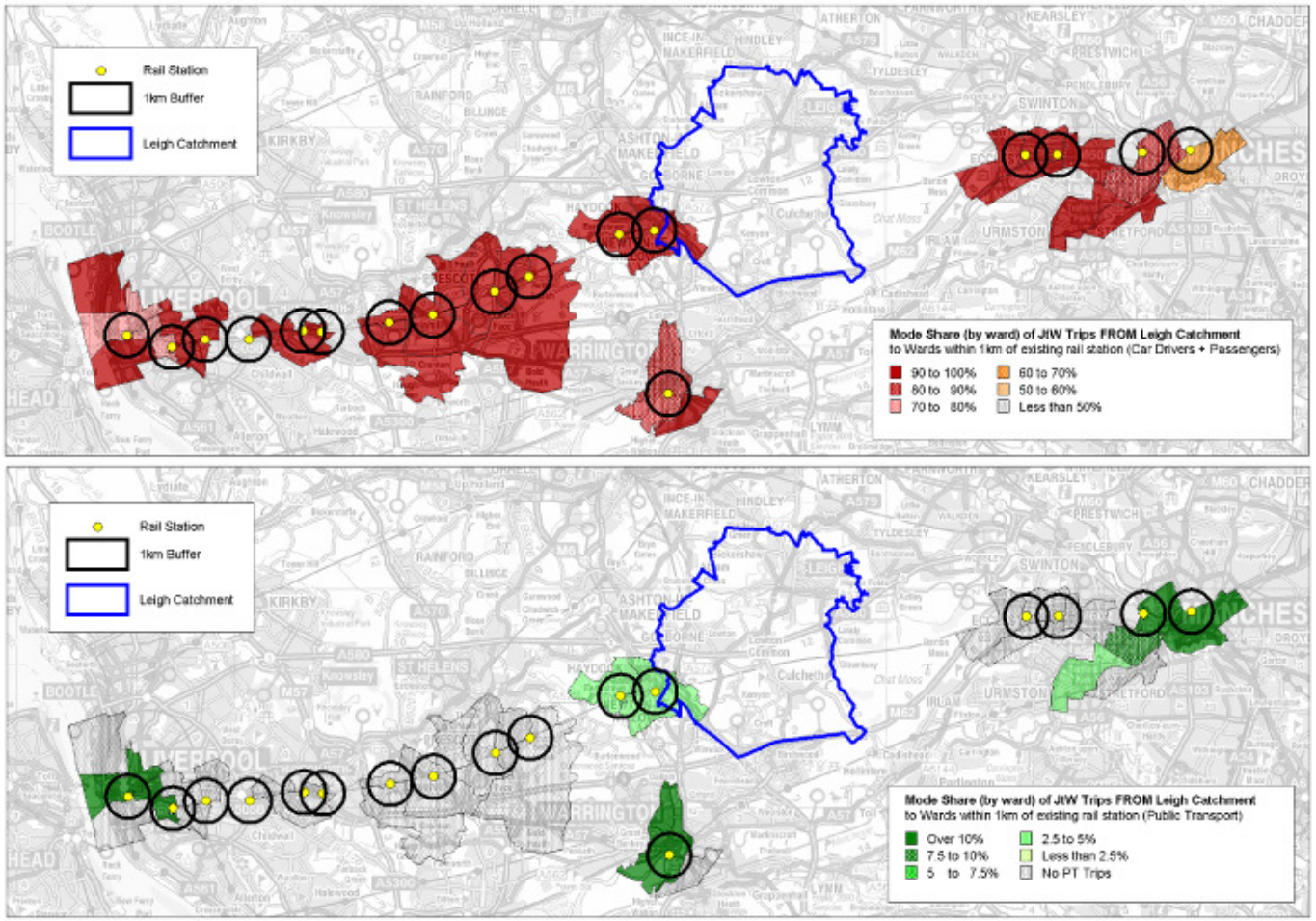


Figure 3.2: Mode Share from Leigh Study Area to Destinations Potentially Served by Rail (Journeys to Work by Ward)



3.6 Figures 3.1 and 3.2 further demonstrate the dependency on car for journeys to work from the Leigh study are and to areas potentially served by a future rail service from Leigh, although it should be noted that the share of public transport is higher to the larger cities and towns of Liverpool, Manchester and Warrington, which is understandable given trends in urban congestion and parking provision.

3.7 Runcorn has not been presented in figures 3.1 and 3.2 in order to improve the presentation. However, there are very few trips from the study area and to Runcorn to support the inclusion.

3.8 The mode shares for Wigan and Greater Manchester are presented in table 3.2 for the resident population of the region.

Table 3.2: Mode Share: Wigan and Greater Manchester (Resident Population)

To	Wigan	Greater Manchester
Car Driver	67.3%	62.4%
Car Passenger	9.6%	8.0%
Public Transport	8.8%	14.7%
Active Modes	12.3%	12.7%
Other	2.1%	2.2%
Total	**100.0%**	**100.0%**

3.9 Consistent with the findings of the Leigh study area, car is the most significantly used mode, with 76.9% of the population in Wigan and 70.4% of the population in Greater Manchester using the car. These figures are lower than for the Leigh study area at 80.0% but serve to demonstrate that even with rail provision, the mode share for car is still high relative to other modes.

4 Station Usage

4.1 Station usage data taken from the Office of Rail Regulation (ORR) datasets has been analysed to observe the numbers of passengers using local stations and the trends in usage between 2002/03 (first year of data availability) and 2009/10 (final year of data availability).

4.2 The stations selected on an individual basis are consistent with those for which Halcrow has requested NRTS data from the DfT. The NRTS data will serve as a basis for determining the potential rail market for the demand forecasts and also provide a basis for benchmarking. There are two exceptions, which are Eccles and

Patricroft, for which NRTS data has not been requested. However, the usage figures at these stations have been included in the table as these stations may possibly incur a reduced frequency of service due to the proposals at Leigh.

4.3 Table 4.1 presents the station usage figures (total entries and exits) and the change between 2002/03 and 2009/10.

Table 4.1: Station Usage Statistics (Passenger Numbers)

Station	2002/03	2009/10	Change	% Change
Atherton	179,915	367,554	187,639	104.3%
Birchwood	307,124	489,242	182,118	59.3%
Daisy Hill	96,385	216,216	119,831	124.3%
Earlestown	183,804	394,374	210,570	114.6%
Eccles	106,462	224,576	118,114	110.9%
Glazebrook	24,902	41,226	16,324	65.6%
Hag Fold	29,457	59,308	29,851	101.3%
Horwich Parkway	165,050	462,000	296,950	179.9%
Irlam	90,587	177,304	86,717	95.7%
Lea Green	110,212	442,548	332,336	301.5%
Newton-le-Willows	217,441	549,908	332,467	152.9%
Patricroft	42,030	101,298	59,268	141.0%
Warrington Bank Quay	949,031	1,073,842	124,811	13.2%
Warrington Central	411,073	1,007,372	596,299	145.1%
Leigh Study Stations	**2,913,473**	**5,606,768**	**2,693,295**	**92.4%**
Wigan Borough	**1,961,270**	**3,431,984**	**1,470,714**	**75.0%**
Greater Manchester	**31,869,824**	**59,435,048**	**27,565,224**	**86.5%**

4.4 There has been a significant increase between 2002/03 and 2009/10 in the numbers of people using each of the stations listed above. Overall the total increase is over 2.6 million passengers for Leigh Area Study Stations, which reflects a 92.4% change in demand. This compares to 75.0% for the Wigan Borough and 86.5% for Greater Manchester as a whole.

4.5 These figures demonstrate the strength of the growth in demand for rail since the 2001 Census and may indicate that demand for a station in Leigh could potentially be higher than tables 2.1 – 3.1 would initially indicate.

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Technical Note – APPENDIX C

Project	Leigh Rail Study	**Date**	26 October 2011
Note	National Rail Travel Survey (NRTS) Analysis	**Ref**	GLARSY / TN3

1 Introduction

1.1 This note summarises the findings of analysis conducted using the National Rail Travel Survey (NRTS) dataset. The analysis conducted covers two spatial levels, these being the entire Greater Manchester area and the localised Leigh catchment.

1.2 The data has been supplied by the Department for Transport (DfT), as a result of Wigan Metropolitan Borough Council's involvement in the study.

1.3 Data for the following stations was provided by DfT:

- Atherton;
- Hag Fold;
- Daisy Hill;
- Irlam;
- Glazebrook;
- Newton-le-Willows;
- Earlestown;
- Birchwood;
- Warrington Central; and
- Warrington Bank Quay.

1.4 The NRTS dataset includes, but is not limited to the following information:

- Origin station;
- Mode of access to origin station;
- Destination station;
- Mode of egress from destination station;
- Trip purpose; and
- Time of travel

1.5 It is possible to estimate the total number of rail trips for any given movement, as expansion factors are included in the dataset. The data set reports the rail demand on an average weekday.

2 Leigh Catchment

2.1 The NRTS rail user origin and destination points are supplied at postcode sector level, accordingly the Leigh catchment has been defined based on this information also. Professional judgement has ensured that the scale of the catchment is realistic.

2.2 Figure 1 and 2 show the area within the Leigh catchment where rail trips originate, and AM peak hours and all day. The matrices are area and station used are reported in Tables 1 and 2.

2.3 Tables 1 and 2 show rail users in the north of the catchment from West and North Leigh use Atherton station, trips from Croft and North Birchwood use Birchwood station, and Golborne use Newton-le-Willows station. Trips from Pennington are split between using Atherton and Newton stations. Trips to Warrington Bank Quay come from the south of the catchment.

Figure 1: AM Peak – Rail Trip Origins in Leigh Catchment, Average Weekday

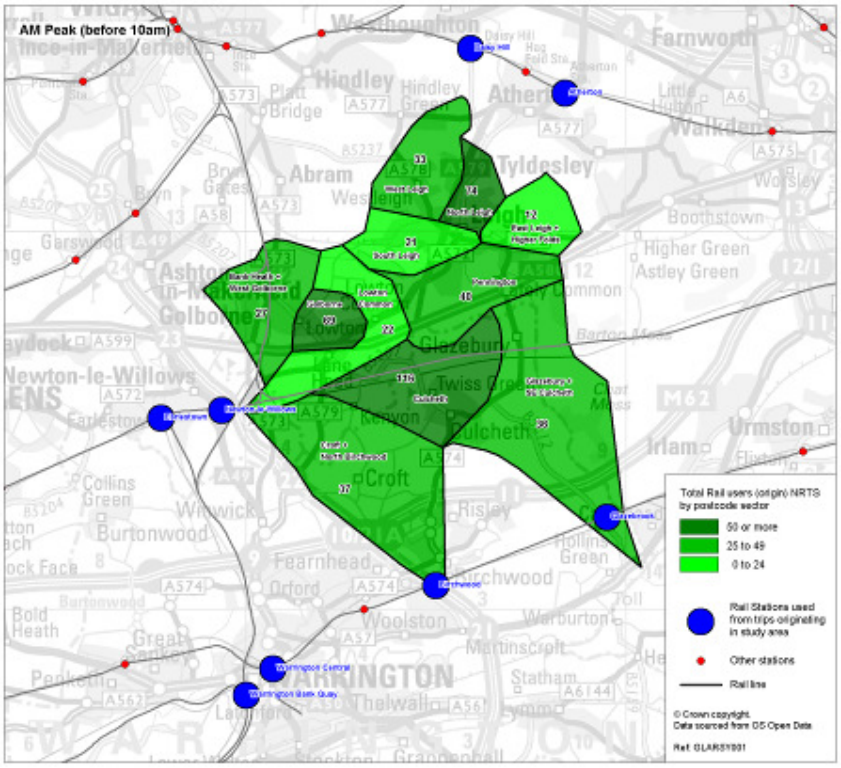


Figure 2: All Day – Rail Trip Origins in Leigh Catchment, Average Weekday

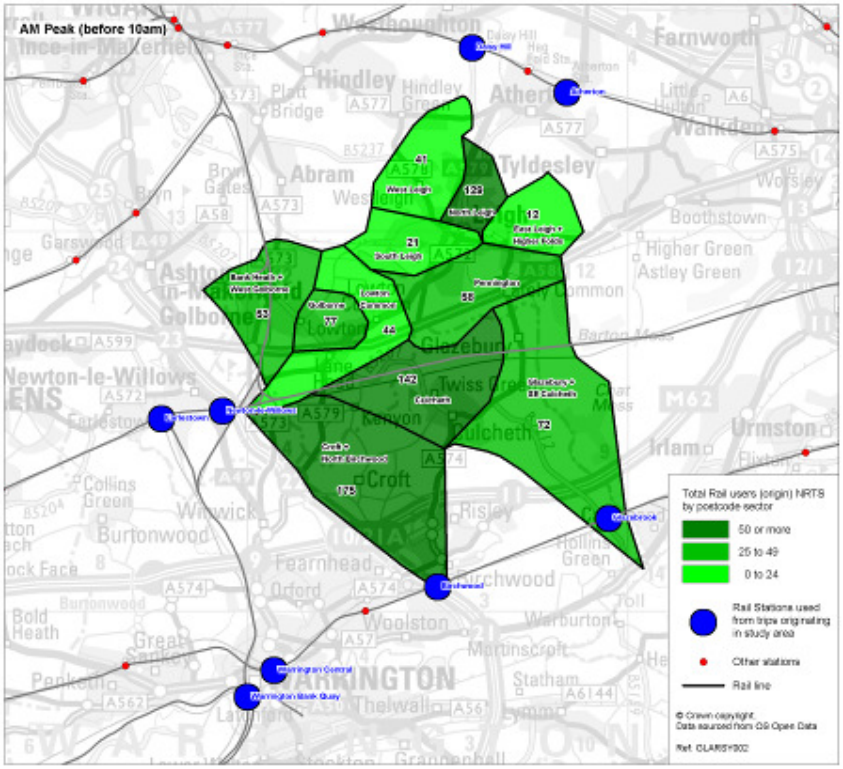


Table 1: Leigh Catchment Area by Station Used – AM Peak Weekday

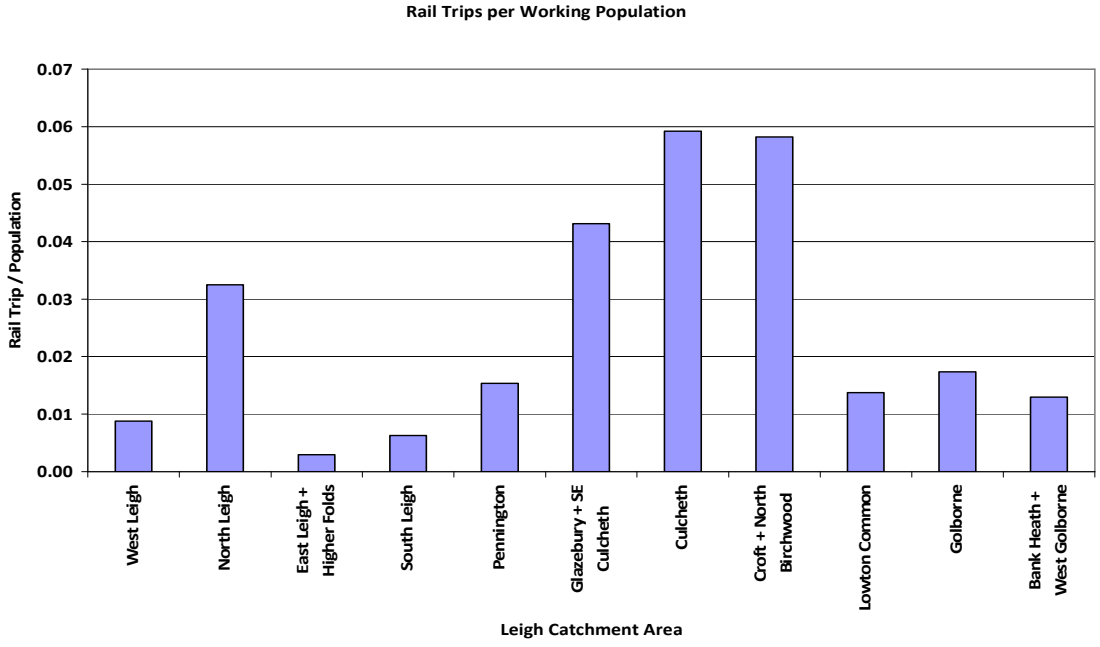
Postcode Sector Name by Station Used	Atherton	Birchwood	Daisy Hill	Earlestown	Glazebrook	Newton-Le-Willows	Warrington BQ	Warrington Central	Total
West Leigh	27	0	7	0	0	0	0	0	**33**
North Leigh	74	0	0	0	0	0	0	0	**74**
East Leigh + Higher Folds	0	0	0	0	0	12	0	0	**12**
South Leigh	12	0	0	0	0	9	0	0	**21**
Pennington	25	3	0	0	0	13	0	0	**41**
Glazebury + SE Culcheth	0	7	0	0	15	2	12	2	**37**
Culcheth	0	85	0	0	0	4	14	14	**117**
Croft + North Birchwood	0	30	0	0	0	0	7	1	**38**
Lowton Common	0	0	0	15	0	7	0	0	**23**
Golborne	0	0	0	0	0	62	8	0	**70**
Bank Heath + West Golborne	6	0	0	0	0	18	4	0	**28**
Total	**143**	**125**	**7**	**15**	**15**	**127**	**44**	**17**	**493**

Table 2: Leigh Catchment Area by Station Used – All Day Weekday

Postcode Sector Name by Station Used	Atherton	Birchwood	Daisy Hill	Earlestown	Glazebrook	Newton-Le-Willows	Warrington BQ	Warrington Central	Total
West Leigh	35	0	7	0	0	0	0	0	**41**
North Leigh	130	0	0	0	0	0	0	0	**130**
East Leigh + Higher Folds	0	0	0	0	0	12	0	0	**12**
South Leigh	12	0	0	0	0	9	0	0	**21**
Pennington	29	3	0	0	0	25	2	0	**59**
Glazebury + SE Culcheth	0	16	0	0	25	4	26	2	**72**
Culcheth	0	92	0	0	0	4	32	14	**143**
Croft + North Birchwood	0	157	0	0	0	0	13	5	**175**
Lowton Common	0	0	0	15	0	7	0	5	**28**
Golborne	0	0	0	0	0	67	10	0	**78**
Bank Heath + West Golborne	12	0	0	0	0	31	11	0	**54**
Total	**218**	**268**	**7**	**15**	**25**	**160**	**95**	**26**	**813**

2.4 Figure 3 shows the rail trip rate per working person in each catchment area. The rate for areas to the south of the catchment is highest, at up to 0.06 trips per person per day, with Newton, Birchwood and Glazebrook stations in these areas. Rates in south Leigh and Pennington have the lower rates and no station within or close the areas.

Figure 3: Rail Trip Area for Leigh Catchment



2.5 Figure 4 indicates the rail stations first used as part of a trip that has originated from within the Leigh catchment, showing passenger demand in the AM Peak, Interpeak, PM Peak and Evening time periods. Figure 5 shows the mode of travel used to access the origin station.

2.6 Figure 6 indicates the rail stations last used as part of a trip that has an ultimate destination within the Leigh catchment, showing passenger demand in the AM Peak, Interpeak, PM Peak and Evening time periods. Figure 7 shows the mode of travel used to egress the destination station.

Figure 4: Origin Rail Station Demand (from trips utilising rail with an ultimate origin within the Leigh Catchment)

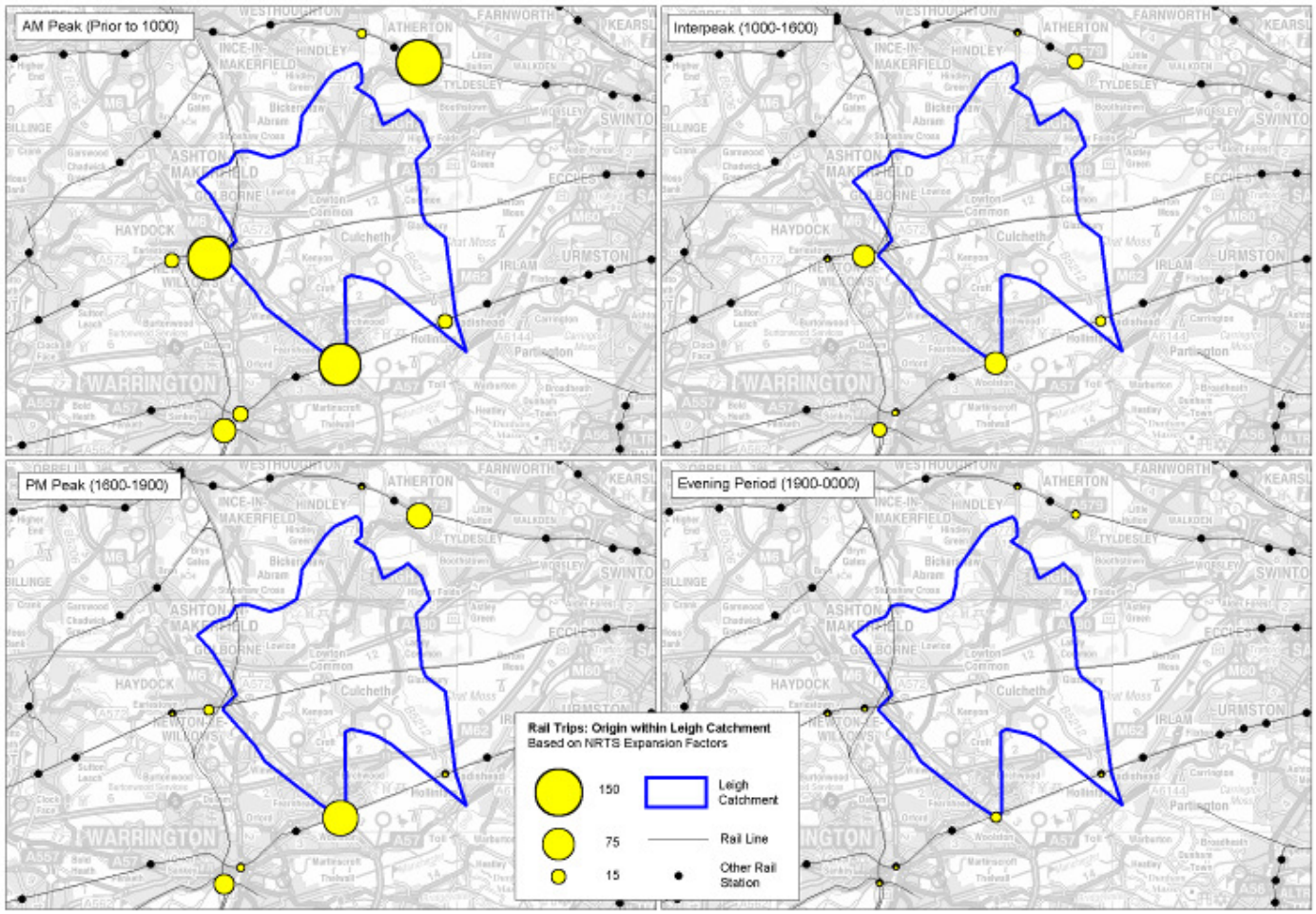


Figure 5: Mode of Travel used to Access Origin Rail Station

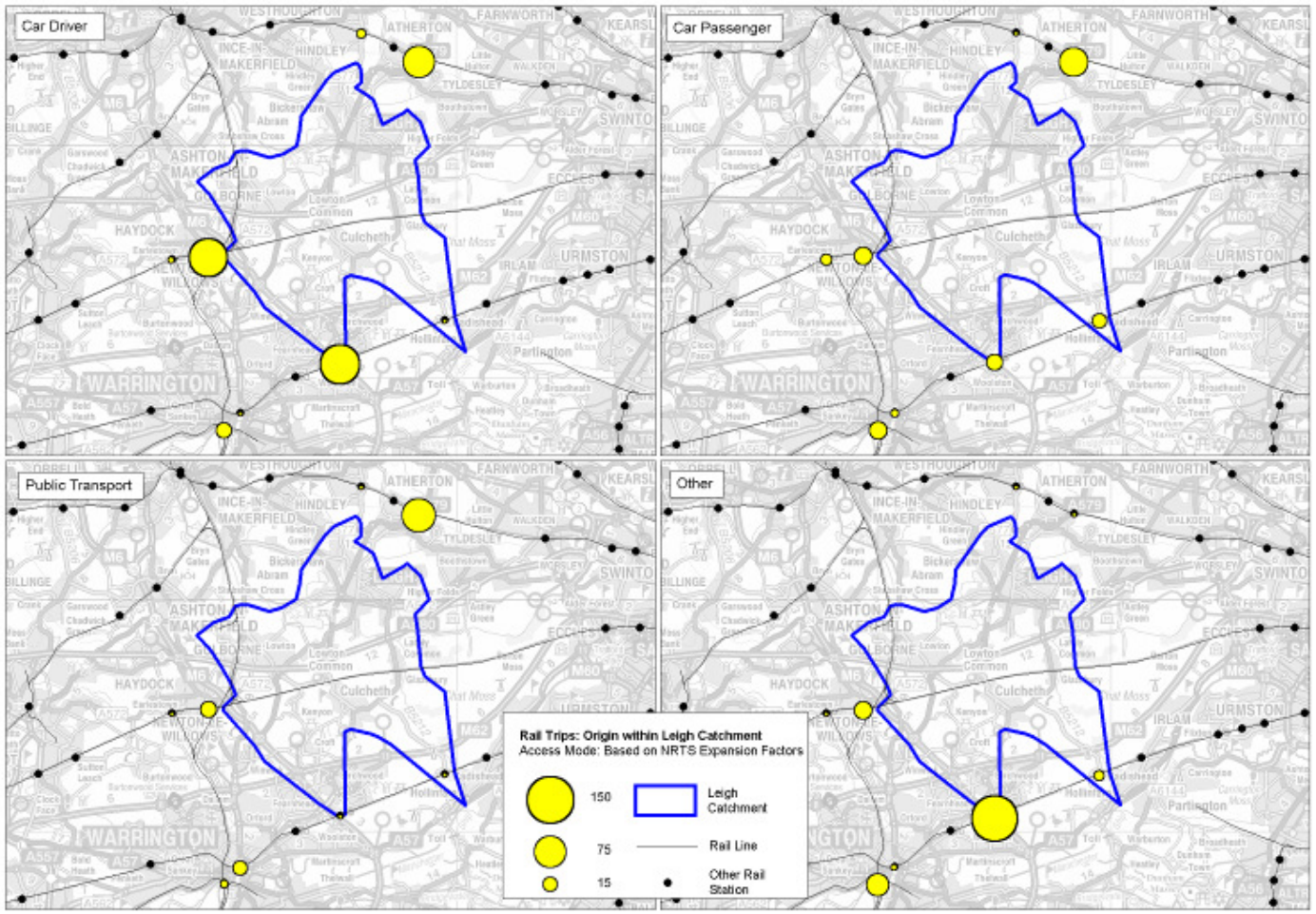


Figure 6: Destination Rail Station Demand (from trips utilising rail with an ultimate destination within the Leigh Catchment)

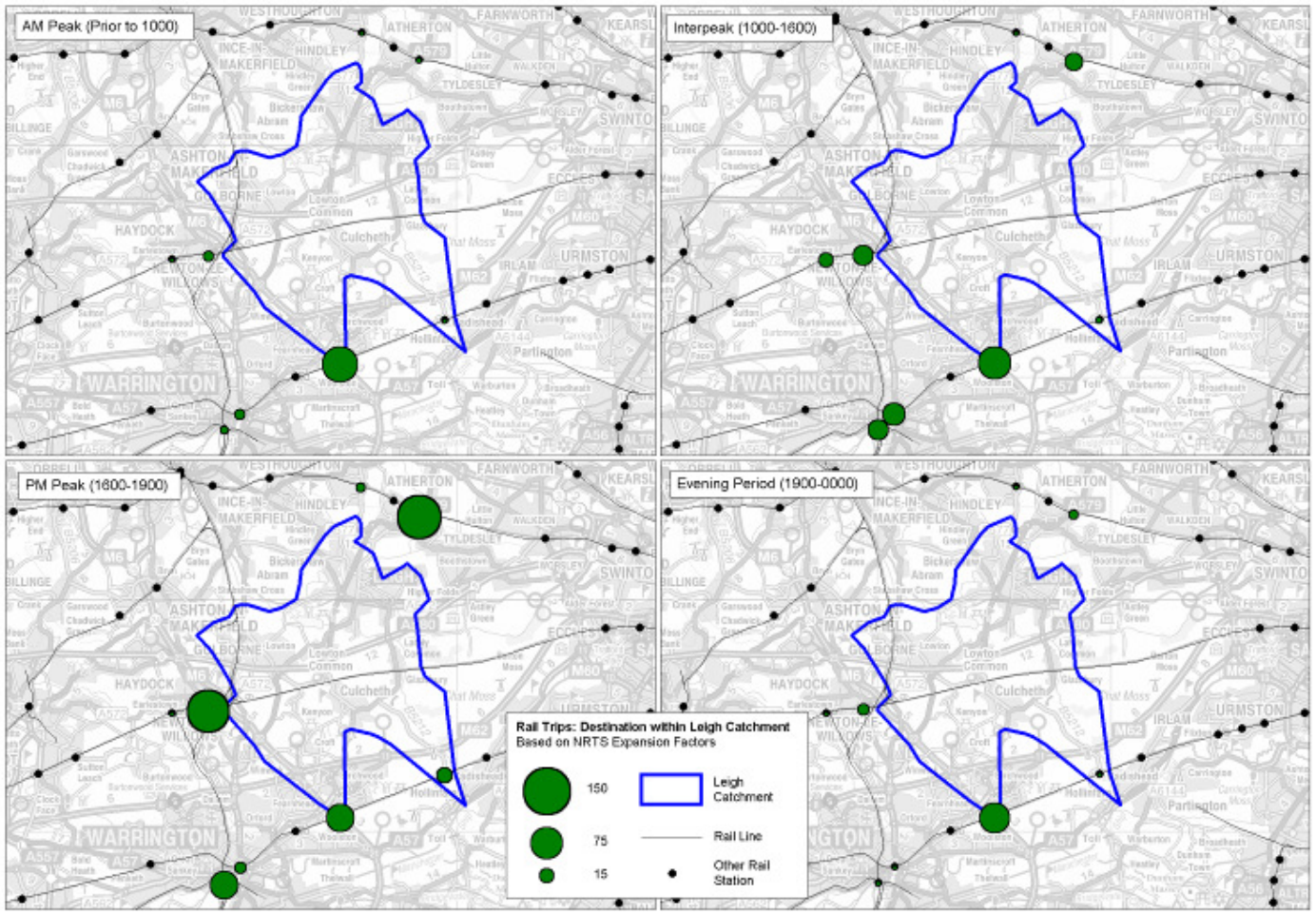
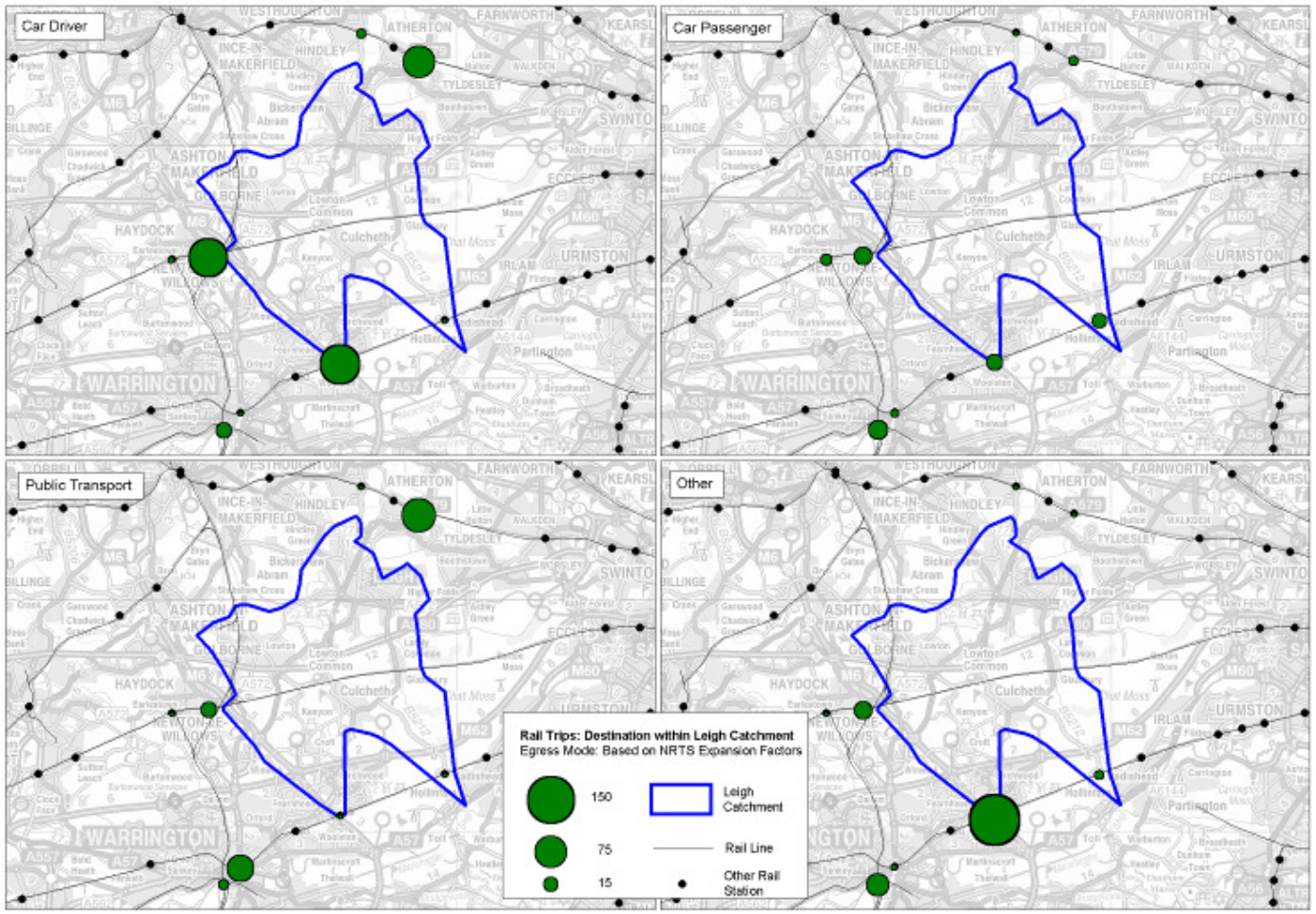


Figure 7: Mode of Travel used to Egress Destination Rail Station



2.7 Table 3 shows the external stations (final rail station destination) for trips utilising rail that have originated from the Leigh catchment.

Table 3: External Stations used for trips with an Origin in the Leigh Catchment

EXTERNAL STATION (Destination)	Expanded Trips	%
MANCHESTER OXFORD ROAD RAIL	152.7	18.4%
MANCHESTER VICTORIA RAIL	116.9	14.1%
LIVERPOOL LIME STREET RAIL	83.5	10.1%
TODMORDEN RAIL	55.6	6.7%
SALFORD RAIL	51.4	6.2%
EUSTON LONDON RAIL	35.1	4.2%
WARRINGTON CENTRAL RAIL	32.1	3.9%
BROAD GREEN RAIL	17.7	2.1%
WIDNES RAIL	17.0	2.0%
SALFORD CRESCENT RAIL	16.5	2.0%
MANCHESTER PICCADILLY RAIL	15.7	1.9%
GLOSSOP RAIL	14.7	1.8%
OXFORD RAIL	13.6	1.6%
WATERLOO (MERSEYSIDE) RAIL	12.0	1.4%
PADGATE RAIL	11.0	1.3%
LEEDS RAIL	10.8	1.3%
COLCHESTER RAIL	10.4	1.3%
HAMPTON COURT RAIL	10.0	1.2%
URMSTON RAIL	8.5	1.0%
STOCKPORT RAIL	8.1	1.0%
LIVERPOOL JAMES STREET RAIL	7.9	1.0%
SOUTHPORT RAIL	7.9	0.9%
HEBDEN BRIDGE RAIL	7.7	0.9%
LANCASTER RAIL	7.6	0.9%
NEWCASTLE RAIL	7.3	0.9%
SHEFFIELD RAIL	6.6	0.8%
UNIVERSITY (BIRMINGHAM) RAIL	5.6	0.7%
BOOTLE ORIEL ROAD RAIL	5.6	0.7%
CREWE RAIL	5.5	0.7%
DURHAM RAIL	5.3	0.6%
DEANSGATE RAIL	5.3	0.6%
RHYL RAIL	5.1	0.6%
GLASGOW CENTRAL RAIL	4.8	0.6%
IRLAM RAIL	4.3	0.5%
READING RAIL	4.1	0.5%
ELLESMERE PORT RAIL	4.0	0.5%
BLACKPOOL NORTH RAIL	3.9	0.5%
BRIGHTON RAIL	3.5	0.4%
WALTON-ON-THAMES RAIL	3.4	0.4%
WATFORD JUNCTION PAR RAIL	3.3	0.4%
MEOLS RAIL	3.1	0.4%
HAZEL GROVE RAIL	3.0	0.4%
SANKEY FOR PENKETH RAIL	2.7	0.3%
HUYTON RAIL	2.7	0.3%
MANCHESTER AIRPORT RAIL	2.6	0.3%
SWINTON (GREATER MAN) RAIL	2.5	0.3%
BROADBOTTOM RAIL	2.3	0.3%
ST ANNES-ON-THE-SEA RAIL	2.2	0.3%
KNUTSFORD RAIL	1.8	0.2%
CHESTER RAIL	1.6	0.2%
HOLMES CHAPEL RAIL	1.3	0.2%
GATLEY RAIL	1.0	0.1%
RUGBY RAIL	0.8	0.1%
MOORFIELDS (LIVERPOOL) RAIL	0.4	0.1%

2.8 Table 4 shows the external stations (first rail station origin) for trips utilising rail that have a destination within the Leigh catchment.

Table 4: External Stations used for trips with a Destination in the Leigh Catchment

EXTERNAL STATION (Origin)	Expanded Trips	%
MANCHESTER OXFORD ROAD RAIL	152.7	18.3%
MANCHESTER VICTORIA RAIL	115.4	13.8%
LIVERPOOL LIME STREET RAIL	73.3	8.8%
SALFORD RAIL	51.4	6.2%
WARRINGTON CENTRAL RAIL	42.9	5.1%
STOKE-ON-TRENT RAIL	35.4	4.2%
EUSTON LONDON RAIL	35.1	4.2%
BIRKENHEAD HAMILTON SQUARE RAIL	23.2	2.8%
BROAD GREEN RAIL	17.7	2.1%
WIDNES RAIL	17.0	2.0%
SALFORD CRESCENT RAIL	16.5	2.0%
MANCHESTER PICCADILLY RAIL	15.7	1.9%
GLOSSOP RAIL	14.7	1.8%
OXFORD RAIL	13.6	1.6%
WATERLOO (MERSEYSIDE) RAIL	12.0	1.4%
PADGATE RAIL	11.0	1.3%
LEEDS RAIL	10.8	1.3%
COLCHESTER RAIL	10.4	1.2%
HAMPTON COURT RAIL	10.0	1.2%
URMSTON RAIL	8.5	1.0%
STOCKPORT RAIL	8.1	1.0%
LIVERPOOL JAMES STREET RAIL	7.9	0.9%
SOUTHPORT RAIL	7.9	0.9%
HEBDEN BRIDGE RAIL	7.7	0.9%
LANCASTER RAIL	7.6	0.9%
NEWCASTLE RAIL	7.3	0.9%
SHEFFIELD RAIL	6.6	0.8%
UNIVERSITY (BIRMINGHAM) RAIL	5.6	0.7%
BOOTLE ORIEL ROAD RAIL	5.6	0.7%
CREWE RAIL	5.5	0.7%
DURHAM RAIL	5.3	0.6%
DEANSGATE RAIL	5.3	0.6%
GLAZEBROOK RAIL	5.2	0.6%
RHYL RAIL	5.1	0.6%
GLASGOW CENTRAL RAIL	4.8	0.6%
IRLAM RAIL	4.3	0.5%
READING RAIL	4.1	0.5%
ELLESMERE PORT RAIL	4.0	0.5%
BLACKPOOL NORTH RAIL	3.9	0.5%
BRIGHTON RAIL	3.5	0.4%
WALTON-ON-THAMES RAIL	3.4	0.4%
WATFORD JUNCTION PAR RAIL	3.3	0.4%
MEOLS RAIL	3.1	0.4%
SANKEY FOR PENKETH RAIL	2.7	0.3%
HUYTON RAIL	2.7	0.3%
CARLISLE RAIL	2.5	0.3%
SWINTON (GREATER MAN) RAIL	2.5	0.3%
BROADBOTTOM RAIL	2.3	0.3%
ST ANNES-ON-THE-SEA RAIL	2.2	0.3%
KNUTSFORD RAIL	1.8	0.2%
CHESTER RAIL	1.6	0.2%
HOLMES CHAPEL RAIL	1.3	0.2%
BIRCHWOOD RAIL	1.1	0.1%
INVERNESS RAIL	1.1	0.1%
GATLEY RAIL	1.0	0.1%
RUGBY RAIL	0.8	0.1%
MOORFIELDS (LIVERPOOL) RAIL	0.4	0.1%

2.9 Analysis of journey purposes has also been conducted with Tables 5 to 8 showing the number of rail trips made by journey purpose, during different time periods. This analysis has been completed for trips utilising rail with either an ultimate origin point or destination point within the Leigh catchment.

Table 5: Journey Purpose and Time of First Train (Origin within Leigh Catchment)

	AM Peak (pre 1000)	Inter Peak	PM Peak (1600-1900)	Evening	Total
Home	7	24	171	14	**216**
Leisure	45	63	15	0	**123**
Normal Workplace	278	10	0	0	**288**
Other Business	129	13	6	2	**149**
Education	34	16	0	0	**50**
Other	0	3	0	0	**3**
Total	**493**	**129**	**192**	**16**	**829**

Table 6: Journey Purpose and Time of First Train (Origin within Leigh Catchment) as Percentage

	AM Peak (pre 1000)	Inter Peak	PM Peak (1600-1900)	Evening	Total
Home	1%	3%	21%	2%	**26%**
Leisure	5%	8%	2%	0%	**15%**
Normal Workplace	33%	1%	0%	0%	**35%**
Other Business	16%	2%	1%	0%	**18%**
Education	4%	2%	0%	0%	**6%**
Other	0%	0%	0%	0%	**0%**
Total	**59%**	**16%**	**23%**	**2%**	**100%**

Table 7: Journey Purpose and Time of First Train (Destination within Leigh Catchment)

	AM Peak (pre 1000)	Inter Peak	PM Peak (1600-1900)	Evening	Total
Home	2	166	368	80	**616**
Leisure	13	41	25	0	**79**
Normal Workplace	80	3	10	5	**97**
Other Business	19	23	3	0	**45**
Education	0	0	0	0	**0**
Other	0	0	0	0	**0**
Total	**113**	**232**	**406**	**85**	**837**

Table 8: Journey Purpose and Time of First Train (Destination within Leigh Catchment) as Percentage

	AM Peak (pre 1000)	Inter Peak	PM Peak (1600-1900)	Evening	Total
Home	0%	20%	44%	10%	**74%**
Leisure	2%	5%	3%	0%	**9%**
Normal Workplace	10%	0%	1%	1%	**12%**
Other Business	2%	3%	0%	0%	**5%**
Education	0%	0%	0%	0%	**0%**
Other	0%	0%	0%	0%	**0%**

Total	**14%**	**28%**	**49%**	**10%**	**100%**

2.10 Tables 9 to 12 show the number of rail trips made by journey purpose and rail station. This analysis has been completed for trips utilising rail with either an ultimate origin point or destination point within the Leigh catchment.

Table 9: Journey Purpose and First Rail Station Used (Origin within Leigh Catchment)

	Home	Leisure	Normal Workplace	Other Business	Education	Other	Total
Atherton	56	21	128	14	0	0	**218**
Birchwood	117	24	28	82	17	0	**268**
Daisy Hill	0	0	7	0	0	0	**7**
Earlestown	0	3	0	0	12	0	**15**
Glazebrook	3	5	15	2	0	0	**25**
Newton-Le-Willows	8	37	92	19	19	3	**176**
Warrington Bank Quay	24	26	9	33	2	0	**95**
Warrington Central	9	8	10	0	0	0	**26**
	216	**123**	**288**	**149**	**50**	**3**	**830**

Table 10: Journey Purpose and First Rail Station Used (Origin within Leigh Catchment) as Percentage

	Home	Leisure	Normal Workplace	Other Business	Education	Other	Total
Atherton	7%	2%	15%	2%	0%	0%	**26%**
Birchwood	14%	3%	3%	10%	2%	0%	**32%**
Daisy Hill	0%	0%	1%	0%	0%	0%	**1%**
Earlestown	0%	0%	0%	0%	1%	0%	**2%**
Glazebrook	0%	1%	2%	0%	0%	0%	**3%**
Newton-Le-Willows	1%	4%	11%	2%	2%	0%	**21%**
Warrington Bank Quay	3%	3%	1%	4%	0%	0%	**11%**
Warrington Central	1%	1%	1%	0%	0%	0%	**3%**
Total	**26%**	**15%**	**35%**	**18%**	**6%**	**0%**	**100%**

Table 11: Journey Purpose and Last Rail Station Used (Destination within Leigh Catchment)

	Home	Leisure	Normal Workplace	Other Business	Education	Other	Total
Atherton	162	0	0	0	0	0	**162**
Birchwood	137	33	97	30	0	0	**297**
Daisy Hill	7	0	0	0	0	0	**7**
Earlestown	15	0	0	0	0	0	**15**
Glazebrook	17	6	0	0	0	0	**23**
Newton-Le-Willows	161	9	0	2	0	0	**172**
Warrington Bank Quay	63	31	0	4	0	0	**98**
Warrington Central	53	0	0	9	0	0	**62**
Total	**616**	**79**	**97**	**45**	**0**	**0**	**836**

Table 12: Journey Purpose and Last Rail Station Used (Destination within Leigh Catchment) as Percentage

	Home	Leisure	Normal Workplace	Other Business	Education	Other	Total
Atherton	19%	0%	0%	0%	0%	0%	**19%**
Birchwood	16%	4%	12%	4%	0%	0%	**35%**
Daisy Hill	1%	0%	0%	0%	0%	0%	**1%**
Earlestown	2%	0%	0%	0%	0%	0%	**2%**
Glazebrook	2%	1%	0%	0%	0%	0%	**3%**
Newton-Le-Willows	19%	1%	0%	0%	0%	0%	**21%**
Warrington Bank Quay	8%	4%	0%	0%	0%	0%	**12%**
Warrington Central	6%	0%	0%	1%	0%	0%	**7%**
Total	**74%**	**9%**	**12%**	**5%**	**0%**	**0%**	**100%**

3 Greater Manchester Analysis

3.1 The NRTS dataset has been reviewed at a higher level in order to ascertain the patterns of travel to and from rail stations. The analysis has focussed upon ascertaining how the journey purpose impacts upon the mode of travel used to access / egress end rail stations. Tables 13 to 16 demonstrate the variance in modal choice across a range of journey purposes.

3.2 Table 17 shows a summary of results by trip purpose. Rail direct trips are those with only one train journey and rail interchange trips include more than one rail service. Over 86% of trips involve only one rail service, with of 89% of commuting trips in the category. Walk access / egress at either or both ends of the trip occurs for 78% of trips, and 88% of commuting trips.

Table 17: Rail Trip Access / Egress Modes and Interchange

Trip Purpose	Trips with Rail Interchange	Percentage of Rail Interchange Trips with Walk at one or both ends of Trip	Trips with Direct Rail	Percentage of Rail Direct Trips with Walk at one or both ends of Trip	Total Rail Trips	Percentage of All Rail Trips with Walk at one or both ends of Trip	%Direct Rail Trips
Commuting	2,174	90.2%	18,288	88.4%	20,462	88.6%	89.4%
Travel for Work	3,000	72.0%	13,486	63.3%	16,486	64.9%	81.8%
Social	3,731	61.5%	13,053	65.4%	16,784	64.5%	77.8%
Shopping	481	89.1%	6,303	85.5%	6,784	85.8%	92.9%
Education	1,082	78.5%	8,913	82.5%	9,995	82.1%	89.2%
Personal Business	500	54.1%	2,528	73.8%	3,028	70.5%	83.5%

Other	1,256	86.2%	18,775	87.4%	20,031	87.4%	93.7%
Total	**12,223**	**74.0%**	**81,347**	**79.0%**	**93,570**	**78.3%**	**86.9%**

Table 13: Access and Egress Modes for Normal Workplace Journeys

	Home to Normal workplace	1	2	3	4	5	6	7	8	9	**Total**	**%**
1	Walked	8,159	769	27	171	0	7	57	670	3	**9,861**	**48%**
2	Bus/Coach	1,434	350	13	57	0	0	22	97	0	**1,974**	**10%**
3	Car (Parked at or near the station)	4,413	362	26	11	0	11	26	273	0	**5,122**	**25%**
4	Car (Dropped off by someone)	1,888	261	3	91	0	2	41	168	0	**2,453**	**12%**
5	Motorcycle	23	2	0	0	0	0	0	0	0	**25**	**0%**
6	Bicycle	151	6	0	6	0	315	0	6	0	**484**	**2%**
7	Air/Sea	131	23	0	8	0	0	47	58	0	**266**	**1%**
8	Taxi/Minicab	231	15	2	0	0	0	16	15	0	**278**	**1%**
9	Other	0	0	0	0	0	0	0	0	0	**0**	**0%**
	Total	**16,428**	**1,787**	**71**	**344**	**0**	**334**	**209**	**1,287**	**3**	**20,462**	**100%**
	Percentage	**80%**	**9%**	**0%**	**2%**	**0%**	**2%**	**1%**	**6%**	**0%**	**100%**	
	Walk at one or both ends of trip	**18130**	**89%**									
	OD other Modes	**2332**	**11%**									

Table 14: Access and Egress Modes for Shopping Journeys

	Shopping	1	2	3	4	5	6	7	8	9	**Total**	**%**
1	Walked	945	202	148	122	0	0	63	87	0	**1,567**	**52%**
2	Bus/Coach	183	106	47	37	0	0	56	11	0	**440**	**15%**
3	Car (Parked at or near the station)	146	48	65	30	0	0	25	18	0	**332**	**11%**
4	Car (Dropped off by someone)	131	47	24	46	0	0	42	33	0	**322**	**11%**
5	Motorcycle	0	0	0	0	0	0	0	0	0	**0**	**0%**
6	Bicycle	3	0	0	0	0	0	0	0	0	**3**	**0%**
7	Air/Sea	52	37	28	28	0	0	41	21	0	**207**	**7%**
8	Taxi/Minicab	54	8	38	37	0	0	19	0	0	**157**	**5%**
9	Other	0	0	0	0	0	0	0	0	0	**0**	**0%**

	Total	**1,514**	**448**	**351**	**300**	**0**	**0**	**247**	**170**	**0**	**3,028**	**100%**
	Percentage	**50%**	**15%**	**12%**	**10%**	**0%**	**0%**	**8%**	**6%**	**0%**	**100%**	
	Walk at one or both ends of trip	**2136**	**71%**									
	OD other Modes	**892**	**29%**									

Table 15: Access and Egress Modes for Educational Journeys

	School/college/university	1	2	3	4	5	6	7	8	9	**Total**	**%**
1	Walked	7,961	1,419	3,939	1,758	9	146	194	268	0	**15,694**	**78%**
2	Bus/Coach	733	365	337	231	2	8	40	21	0	**1,737**	**9%**
3	Car (Parked at or near the station)	54	11	36	11	0	0	7	9	0	**128**	**1%**
4	Car (Dropped off by someone)	225	73	12	98	0	7	33	19	0	**466**	**2%**
5	Motorcycle	0	0	0	0	0	0	0	0	0	**0**	**0%**
6	Bicycle	8	0	18	2	0	274	0	0	0	**302**	**2%**
7	Air/Sea	86	29	21	38	0	0	82	24	9	**289**	**1%**
8	Taxi/Minicab	700	113	258	162	0	11	67	97	0	**1,408**	**7%**
9	Other	0	0	0	0	0	0	8	0	0	**8**	**0%**
	Total	**9,766**	**2,010**	**4,621**	**2,299**	**10**	**446**	**431**	**439**	**9**	**20,031**	**100%**
	Percentage	**49%**	**10%**	**23%**	**11%**	**0%**	**2%**	**2%**	**2%**	**0%**	**100%**	
	Walk at one or both ends of trip	**17499**	**87%**									
	OD other Modes	**2532**	**13%**									

Table 16: Access and Egress Modes for Personal Business Journeys

	Home	1	2	3	4	5	6	7	8	9	**Total**	**%**
1	Walked	3,594	553	1,126	645	5	21	591	460	8	**7,003**	**42%**
2	Bus/Coach	569	230	83	122	0	7	110	102	3	**1,226**	**7%**
3	Car (Parked at or near the station)	1,245	80	164	70	0	4	467	455	0	**2,485**	**15%**
4	Car (Dropped off by someone)	908	174	87	152	0	5	370	284	0	**1,978**	**12%**
5	Motorcycle	3	0	8	0	0	0	1	0	0	**11**	**0%**
6	Bicycle	27	10	7	8	0	130	5	12	0	**199**	**1%**
7	Air/Sea	506	108	341	291	2	5	529	255	0	**2,037**	**12%**
8	Taxi/Minicab	412	80	381	235	0	13	253	143	0	**1,517**	**9%**
9	Other	20	2	0	6	0	0	2	0	0	**30**	**0%**

	Total	**7,284**	**1,238**	**2,197**	**1,528**	**7**	**183**	**2,327**	**1,711**	**10**	**16,486**	**100%**
	Percentage	**44%**	**8%**	**13%**	**9%**	**0%**	**1%**	**14%**	**10%**	**0%**	**100%**	
	Walk at one or both ends of trip	**10693**	**65%**									
	OD other Modes	**5793**	**35%**									

4 Summary

4.1 The analysis of the NRTS data in the context of the wider Leigh Rail Study has led to the following conclusions:

- Atherton, Newton-le-Willows and Birchwood are the main stations used by rail passengers in the Leigh catchment area. Atherton is favoured by those in the north of the catchment, and Newton and Birchwood by those in the south of the catchment.
- Manchester is the destination that attracts the largest amount of rail trips from the Leigh catchment;
- 59% of trips that originate within the Leigh catchment and utilise rail travel on their first train prior to 1000 hrs. The corresponding figures are 16% during the Interpeak, 23% during the PM Peak and just 2% during the Evening Peak.
- 48% of trips that terminate within the Leigh catchment and utilise rail travel on their first train between 1600 and 1900 hrs. The corresponding figures are 14% during the AM Peak, 28% during the Interpeak and just 10% during the Evening Peak.
- Birchwood, Atherton and Newton-le-Willows see the most demand of the rail stations that currently serve the Leigh catchment.
- There are only fairly limited records of rail users using public transport to access / egress the stations that currently serve the Leigh catchment. Travel by car and other modes (which include walking and cycling) dominate the access / egress from these rail stations. Atherton sees the largest amount of public transport travel of all the stations.
- Journey purpose data shows that 74% of journeys terminating within the Leigh catchment do so in order to reach home and 12% to reach their normal workplace. In the opposite direction (trips that originate within the Leigh catchment) 26% are seeking to reach home and 35% to reach their normal workplace.
- Across Greater Manchester 89% of rail journeys to a normal workplace walk to both the origin rail station and from the destination rail station. This demonstrates the importance of locating any new rail station facilities within walking distance of employment opportunities.

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Technical note – APPENDIX D

Project	Leigh Area Rail Study	**Date**	1 December 2011
Note	Cost Comparisons Halcrow & Stobart	**Ref**	GLARSY

1. Introduction

1.1 The cost comparison was carried out between Halcrow and Stobart Rail estimates for a rail link to Pennington in Leigh.

1.2 The method of cost compilation and the categorisation of elements differ between the Halcrow and Stobart methods. In order to allow the Stobart costs to be compared on a like for like basis in the format already used in the evaluation for TfGM, a categorisation was created, with each Stobart cost element allocated to a cost category that has been already in use in the Halcrow analysis.

1.3 In order to further ensure like for like comparability the TfL Pennington line proposal was compared with Halcrow Option 1 Pennington – Victoria service and Option 2 Warrington – Pennington - Victoria.

1.4 Costs have all been converted to 2016 outturn costs, so are presented on a common price base.

2. General Findings

2.1 Itemised costs are not necessarily dissimilar when aggregated, although in three areas they do differ significantly.

2.2 The aggregated total including project costs and contingency of the Stobart scheme is within the range of Halcrow options 1 and 2. Overall though each achieves a line to a station at Pennington, albeit using different routes and project structures.

2.3 Stobart's assumptions on project costs are lower than Halcrow's in terms of overall percentages; this excludes Stobart's allowances for design which they present after the itemised list next to the project costs. For this comparison design costs have been treated as works costs, as per the Halcrow assumption.

2.4 Some differences exist in the final project costs methodology depending on which cost the percentage allowances are applied. We have reworked Stobart's percentages, applying them to the specific items; Stobart gave separate consideration only to certain S&T costs. The difference still puts total project costs and contingency between GBP 30m and GBP 45m.

3. Station Costs

3.1 Stations costs in the Stobart estimates are about 25% higher at GBP 4.1m compared to Halcrow's GBP 3.3m. This can be largely explained by the higher specification assumptions made in the Stobart estimates.

3.2 This should make the difference greater that it is, but Halcrow's estimates include an item for land purchase for the station which the Stobart figures do not. Adding land costs to the Stobart estimates would significantly increase the station costs, but there does not appear to be an allowance for this that can be separated out. (See also the section below on land cost assumptions.)

4. Track Costs

4.1 Stobart's overall track cost estimates are substantially higher at GBP 5.6m compared to GBP 3.6m from Halcrow Option 1 and GDP 8.9 for Option 2. This is accounted for by the longer route taken between Leigh and the Chat Moss line. On to its overall figure Halcrow also adds a road overbridge at the East Lancs Road. Without this cost the Stobart unit cost is 7% lower for track at GBP 1.11m/km compared to GBP 1.19m/km. This can be viewed as being within the bounds of reasonable variation at this stage.

4.2 Stobart's estimates for turnouts may be low as we believe 6 or 7 turnouts will be needed rather than the 5 or 8 cited, which will bring pro rata costs closer to Halcrow's

4.3 We understand that the Stobart estimates assumed that a single line would suffice; the Halcrow operational analysis suggests that this is impossible in Option 2 and only possible in Option 1. Nevertheless the amount of layover time found to be necessary in Halcrow's operational analysis should be capable of absorbing the additional travel time on Stobart's longer alignment. We note that detailed work would need to be done to confirm the ability of the alignment to allow reasonable line speeds on curves and at junctions in this respect, but that this lies beyond the scope of the current brief.

5. Infrastructure and Earthworks

5.1 Stobart are cheaper at GBP 7.3m and Halcrow range from GBP 9.7m to 11.2m. The difference is starker when viewed per km, at 65%, with Stobart at GBP 1.46m/km and Halcrow at GBP 3.22/km. Although the Halcrow route is shorter the difference can be accounted for by the inclusion of a new bridge to cross under the East Lancs Road at GDP 6m; Stobart's longer route exploits an existing bridge.

6. Signalling

6.1 Halcrow's costs per km of signalled railway are lower than those of Stobart even after taking account of route length. Having reviewed our project source costs it is likely that our own initial costs may be to be too low as they are based on the marginal costs at the time of the proposed Chat Moss upgrading required for electrification rather than a from scratch build.

6.2 It is noted also that Stobart have assumed axle counters rather than track circuits, axle counters being more expensive.

7. Electrification

7.1 Halcrow has used a cost per metre of GBP 360. Stobart's estimates give a cost of GBP 1,280/m. This difference appears somewhat difficult to fully explain, but our electrification engineer considers that the Stobart estimates may represent a more heavy duty installation than is likely to be needed in this case.

8. Land Acquisition Costs

8.1 This is an area of substantial difference. Halcrow has assumed land being purchased at market rates for all operational property including railway alignment. Much of the previous

alignment on the corridor has been converted into a road. It is understood that part of the land is already allocated for new housing, so will cost premium rates to purchase.

8.2 Stobart's estimates assume that a pre-existing alignment be used and land is purchase under Compulsory Purchase arrangements. This is residual BR land now under the ownership of the DfT. It is not clear at what price DfT would make this land available.

8.3 The current difference in land cost assumptions cannot be reconciled without detailed assessment of the actual costs likely to be involved. It is suggested that a sensitivity test be carried out regarding these two figures.

9. Project Cost Assumptions

9.1 These include fees, Network Rail Costs and contingency. The Stobart estimates include a civils and signalling design assumptions that have been moved in this analysis into the relevant cost categories. Stobart allow 46% for project costs and 35% for contingency (optimism bias), and Halcrow allow for 59% project costs and 66% contingency.

9.2 Of the remaining items two are lump sum costs and these have been split 50/50 between station and route capital costs for the purposes of this exercise.

10. Overall Comparison

10.1 A summary of the Stobart costs with the two Halcrow options is provided below.

Cost Item £m's	Stobart - 4km route	Halcrow - 2.4km route - Option 1	Halcrow - 2.4km route - Option 2	Main Reason for Difference
Station	4.1	3.3	3.3	Specification
Track	5.6	3.6	8.9	Length of route and amount of double track
Infrastructure / Earthworks	7.3	9.7	11.2	Bridge / Earthworks due to different route
Signalling	9.6	3.1	5.5	New / Marginal upgrade
Overhead electrification	6.4	1.1	2.1	Specification
Land Costs	2.4	6.7	13.0	Land Values
Project Costs	16.1	16.2	26.1	Rates Applied
Contingency / Optimism Bias	12.4	18.1	29.1	Rates Applied
Total	**64.0**	**61.8**	**99.3**	

Note: All costs are £m's in 2016 Outturn Costs

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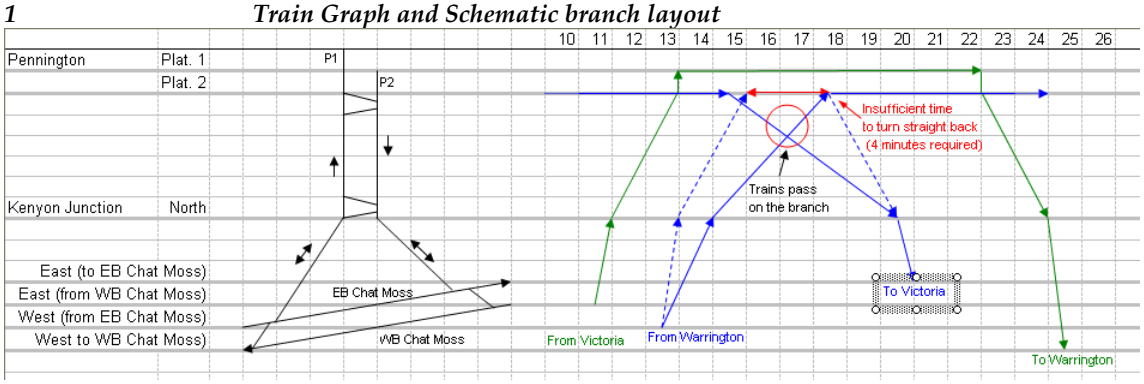
Technical note - APPENDIX E

Project	Leigh Area Rail Study	**Date**	2 December 2011
Note	Explanation of Double track requirement for option 2	**Ref**	GLARSY

1 *Train Graph and Schematic branch layout*



2 *Explanation of the diagram*

2.1 Leftmost is a list of locations which the schematic branch layout and the train graph use. Note this axis is not to scale.

2.2 Immediately to the right of the locations list is the schematic showing the double track branch connecting to the Chat Moss line via two single track sections and two junctions. The single track sections are by necessity bi-directional as indicated by the arrows. Note: The platform 1 track is shown longer only so it matches up with the location list, the same applies to the east by north east alignment of the Chat Moss line.

2.3 On the far right is the train graph. This has time on the x-axis and distance on the y-axis.

2.4 Note that the times that trains pass Kenyon East and West junctions are fixed and are dictated by the Northern Hub draft timetable.

2.5 Green lines represent the west bound service; from the graph it can be seen to run into Pennington from Kennington East Junction, dwell and run out again via Kennington West Junction; there is sufficient time between the arrival and the departure to satisfy the requirement for a minimum 4 minute turnaround (This allows time for the driver to shut down one cab, walk to the other end, set up the other cab and get ready for departure) and so these two services can be linked.

2.6 Blue lines represent eastbound services, the dashed blue lines show when the trains would pass Kenyon North junction and arrive and depart from Pennington if the normal running times on the branch were observed

2.7 However, as shown by the red line, there is insufficient time to turn straight back at Pennington and so to avoid the need for a third platform the eastbound services have been slowed to arrive later at Pennington and depart earlier from Pennington; typically three minutes are required between a train departing from a platform and another arriving at the same platform.

2.8 The unfortunate consequence of this is that trains now cross on the branch and double track is required.

3 ***A third platform***

3.1 There are two possible locations for a third platform at Pennington, it could either be connected to the arrival line and be positioned next to platform 1 or it could be connected to the departure line and be positioned next to platform 2.

3.2 In either location the problem is that there would be insufficient time between the arrival of an eastbound service and the departure of the next eastbound service.

3.3 The assumed headway on the branch is three minutes meaning that the arriving eastbound service must be slowed on approach to Kenyon North junction to follow three minutes behind the preceding westbound service.

3.4 From Kenyon North Junction it can run to its normal running time arriving at xx:16 in the diagram, this however only leaves 1½ minutes before the departure of the next eastbound service.

3.5 Eastbound services must alternate between platform 2 and the new platform 3. At best an arriving eastbound train would cross the route of the departing eastbound train once an hour and the margin of 1½ is not practical and therefore this option can be discounted.

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Technical note - APPENDIX F

Project	Leigh Area Rail Study	**Date**	2 December 2011
Note	Detailed Cost Tables	**Ref**	GLARSY

Cost tables for the following are provided in this note:

- **Heavy Rail Track and Infrastructure**
- **Heavy Rail Station and Other Costs**
- **Heavy Rail Operating Costs**
- **Bus Shuttle Services**
- **Park and Ride Costs**
- **PPM Costs**
- **Capital Cost Summary**
- **Operating Cost Summary**

All costs are reported in 2016 Outturn Costs

Heavy Rail Track and Infrastructure **2016 Outturn Costs**

Cost Item			Option 1 – Pennington to Victoria Service		Option 2 – Warrington to Victoria via Pennington Service		Options 3, 4 and 5 – New Station on Chat Moss Line	
Fixed Costs	**Unit**	**Unit Cost**	**Qty**	**Cost**	**Qty**	**Cost**	**Qty**	**Cost**
Plain line (single track)	m	£944	2,180	£2,057,080	1,550	£1,462,603	0	£0
Plain line (double track)	m	£1,887	150	£283,084	1,630	£3,076,184	0	£0
Switch	each	£314,538	4	£1,258,153	14	£4,403,535	0	£0
Flat crossing	each	£359,832	0	£0	0	£0	0	£0
Overhead electrification	m of single track	£440	2,480	£1,092,077	4,810	£2,118,100	0	£0
Signalling (general)	m of route	£453	2,330	£1,055,339	3,180	£1,440,333	0	£0
Signalling (junct mods)	each	£2,013,045	1	£2,013,045	2	£4,026,089	0	£0
Land purchase for track	sq.m	£434	15,500	£6,727,972	30,063	£13,049,011	0	£0
Level crossing on public road	each	£1,918,683	1	£1,918,683	1	£1,918,683	0	£0
Retaining walls	m	£1,258	200	£251,631	200	£251,631	0	£0
East Lancs Rd bridge/road diversions/rail c&c tu	each	£7,548,917	1	£7,548,917	1	£9,058,701	0	£0
Project management	%age	n/a	15%	£3,631,407	15%	£6,121,750	15%	£0
Project design and development	%age	n/a	15%	£3,631,407	15%	£6,121,750	15%	£0
Interfacing/commissioning	%age	n/a	15%	£3,631,407	15%	£6,121,750	15%	£0
NR costs	%age	n/a	15%	£3,631,407	15%	£6,121,750	15%	£0
Contingency allowance	%age	n/a	66%	£15,978,189	66%	£26,935,698	66%	£0
Total				**£54,713,193**		**£92,234,360**		**£0**

Heavy Rail Station and Other Costs **2016 Outturn Costs**

Cost Item			Option 1 – Pennington to Victoria Service		Option 2 – Warrington to Victoria via Pennington Service	
Fixed Costs	**Unit**	**Unit Cost**	**Qty**	**Cost**	**Qty**	**Cost**
Station platform	each	£2,142,383	1	£2,142,383	1	£2,142,383
Footbridge	each	£629,076	0	£0	0	£0
Booking Office	each	£113,234	1	£113,234	1	£113,234
Land purchase	sq.m	£434	1750	£759,610	1750	£759,610
Project management	%age	n/a	15%	£452,284	15%	£452,284
Project design and development	%age	n/a	10%	£301,523	10%	£301,523
Interfacing/commissioning	%age	n/a	10%	£301,523	10%	£301,523
NR costs	%age	n/a	15%	£452,284	15%	£452,284
Contingency allowance	%age	n/a	66%	£1,990,050	66%	£1,990,050
Total				**£6,512,890**		**£6,512,890**
TOTAL HEAVY RAIL				**£61,226,082**		**£98,747,249**

Heavy Rail Operating Costs **2016 Outturn Costs**

Cost Item			Option 1 – Pennington to Victoria Service		Option 2 – Warrington to Victoria via Pennington Service		Options 3, 4 and 5 – New Station on Chat Moss Line	
Variable Costs per day	**Unit**	**Unit Cost**	**Qty**	**Cost**	**Qty**	**Cost**	**Qty**	**Cost**
Rolling stock lease	4 car set	£2,102.67	4.00	£8,411	6.00	£12,616	0.00	£0
Traction power costs	mile	£1.21	1052.80	£1,272	1720.00	£2,077	0.00	£0
Driver	hour	£42.40	33.33	£1,413	81.33	£3,449	0.00	£0
Conductor	hour	£23.44	33.33	£781	81.33	£1,906	0.00	£0
Track access (fixed)	/track-km	£51.70	2.48	£128	4.81	£249	0.00	£0
Track access (variable)	mile	£0.25	1052.80	£261	1720.00	£427	0.00	£0
Electrification asset usage	daily	£0.06	1052.80	£61	1720.00	£100	0.00	£0
Asset maintenance	daily			£620		£620		£918
Total Daily				**£13,219**		**£21,715**		**£1,189**
Total Annual				**£4,443,652**		**£7,287,740**		**£425,827**

Park and Ride Costs **2016 Outturn Costs**

Option	Required Spaces	Capital Cost	Annual Operating Cost
Option 1- Pennington to Manchester Victoria Service	250	£1,827,467	£125,815
Option 2- Warrington to Manchester Victoria via Pennington	350	£2,558,454	£176,141
Option 3- Pennington Station with rail shuttle service	200	£1,461,974	£100,652
Option 4- New Station at Glazebury	150	£1,096,480	£75,489
Option 5- New Station at Kenyon	200	£1,461,974	£100,652

Bus Shuttle Services **2016 Outturn Costs**

Time Period	Vehicle Hours	Operating Costs
Shuttle Service Daily	50.8	£2,237
Annual	15240	£671,099

PPM Costs **2016 Outturn Costs**

Cost Element	Costs
Station Platform	£1,428,255
Line	£2,887,461
Signalling	£1,092,077
Land	£5,566,131
Project Management	£811,169
Project Development	£270,390
Interfacing/Commissing	£270,390
NR Costs	£811,169
Vehicle Purchase	£50,326
Operating Costs	£62,908
Staffing Costs	£377,446
Depot and Storage Costs	£125,815
Renewals	£5,583,934

Capital Cost Summary **2016 Outturn Costs**

Option	Heavy Rail	Park and Ride	Bus Shuttle	Highway Schemes	PPM	TOTAL
Option 1- Pennington to Manchester Victoria Service	£61,226,082	£1,827,467	£0	£0	£0	£63,053,549
Option 2- Warrington Bank Quay to Manchester Victoria via Pennington	£98,747,249	£2,558,454	£0	£0	£0	£101,305,703
Option 3- Kenyon Station with PPM shuttle service to Pennington and Town Centre	£9,645,164	£1,461,974	£0	£6,061,969	£30,370,477	£47,539,584
Option 4- New Station at Glazebury	£9,645,164	£1,096,480	£0	£323,723	£0	£11,065,367
Option 5- New Station at Kenyon with Highway Link and Shuttle Buses	£9,645,164	£1,461,974	£0	£6,061,969	£0	£17,169,107

Operating Cost Summary **2016 Outturn Costs**

Option	Heavy Rail	Park and Ride	Bus Shuttle	Highway Schemes	PPM	TOTAL
Option 1- Pennington to Manchester Victoria Service	£4,443,652	£125,815	£0	£0	£0	£4,569,467
Option 2- Warrington Bank Quay to Manchester Victoria via Pennington	£7,287,740	£176,141	£0	£0	£0	£7,463,882
Option 3- Kenyon Station with PPM shuttle service to Pennington and Town Centre	£425,827	£100,652	£0	£0	£1,527,230	£2,053,710
Option 4- New Station at Glazebury	£425,827	£75,489	£0	£0	£0	£501,317
Option 5- New Station at Kenyon with Highway Link and Shuttle Buses	£425,827	£100,652	£671,099	£0	£0	£1,197,578