

# LEA VALLEY RAIL



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This report shows how much more the existing railways can achieve and contribute to the Lea Valley's future economic, social and environmental goals.

The Lea Valley requires better connectivity, to help the creation of new jobs and homes and to enable the area's economic structure to strengthen and grow, with catchments accessible by public transport. This requires smart thinking, better use of existing infrastructure and a few new elements.

The Chingford Line Users Association (CLUA) and Railfuture have looked particularly at the Waltham Forest catchments. Waltham Forest is the 'borough across the Valley' and needs better integration into the main Lea Valley transport corridors.

JRC was commissioned in March 2012 by CLUA and Railfuture (who funded the report) to write an appraisal of three significant rail projects in the Lea Valley, and to set out their merits.

This report responds to that commission. It describes each scheme sequentially, the rationales and merits of the proposals, present status, service plans, foreseeable demand and costs, funding matters and next steps. The report's structure is:

Part 1: The Lea Valley's economic, planning and transport context

Part 2: Reopening Lea Bridge station

Part 3: Better Lea Valley rail services

Part 4: Chingford Line access to Stratford.

Practitioners and campaigners will appreciate that securing even small changes in railway services and infrastructure can be a lengthy challenge that needs the best arguments and clarity about the project purpose, and to set out these points to stakeholders, funders and decision-makers. JRC hopes that this report will help the advocates of these rail projects to make the case successfully.

The desired forward timetable for the main projects offers the prospect of continuing improvements in Lea Valley Rail over the next decade, which is in keeping with the wider regeneration and economic growth agenda for the Lea Valley:

2012 Inclusion of an improved local Lea Valley rail service in 2014-19 spending

2013 Go ahead for Lea Bridge station re-opening, final planning for Lea Valley locals

2014 Lea Bridge re-opened, start of work on Lea Valley locals, Hackney Interchange

2015 Completion of initial works and roll-out of first improved local services

2016 Initial stance on project priorities in 2019-24, incl case for Chingford-Stratford.

## Part 1 — INTRODUCTION

The Lea Valley is full of contrasts:

- a working part of London with many local jobs versus commuter suburbs served from Liverpool Street and Stratford
- results of deprivation and social exclusion versus high priority plans for regeneration
- limited choice of tube services but newly improved orbital rail lines
- few cross valley routes and clogged radial and orbital roads.

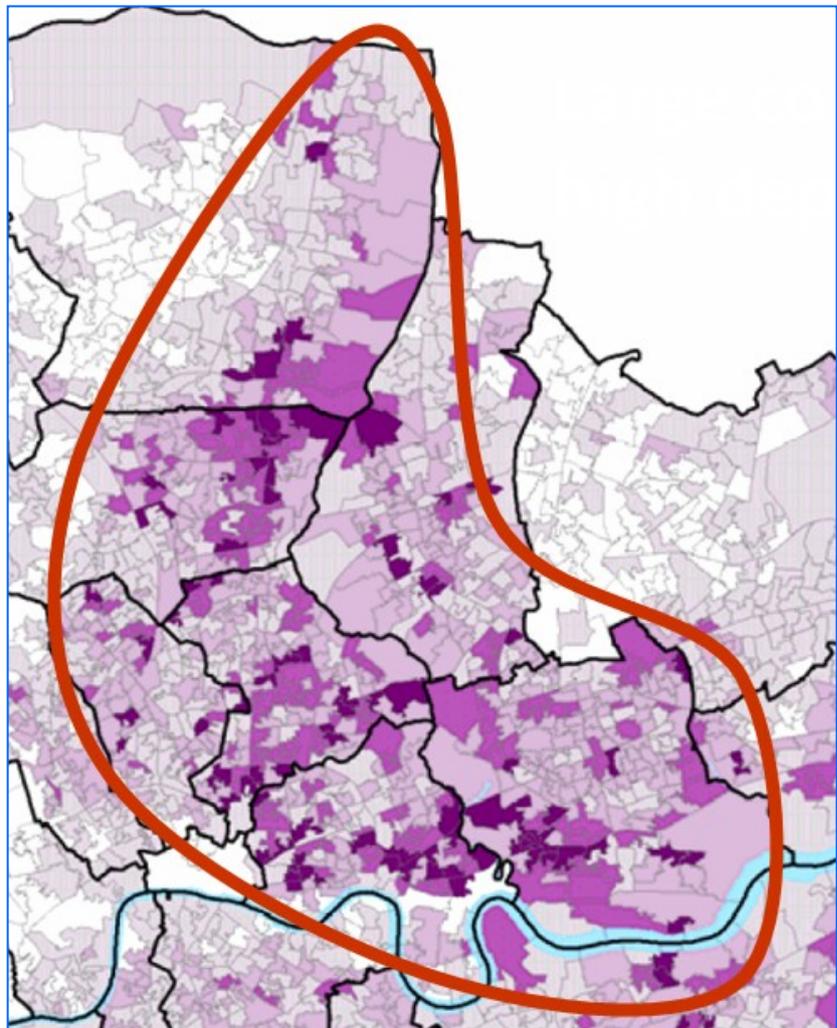
Amidst all this, the Lee Valley Regional Park is an oasis of green leisure and waterside recreation.

The area is part of the Arc of Deprivation extending from the Thames to the northern Greater London boundary.

This is highlighted with purple and pink showing the localities among the worst 5-20% most deprived in England in 2010.

Major stakeholders include:

- The London Boroughs of Enfield, Hackney, Haringey, Newham, Tower Hamlets and Waltham Forest
- Regional authorities including the Mayor of London, Greater London Authority, Lee Valley Regional Park
- Transport bodies including Transport for London, Department for Transport, Network Rail, Greater Anglia.

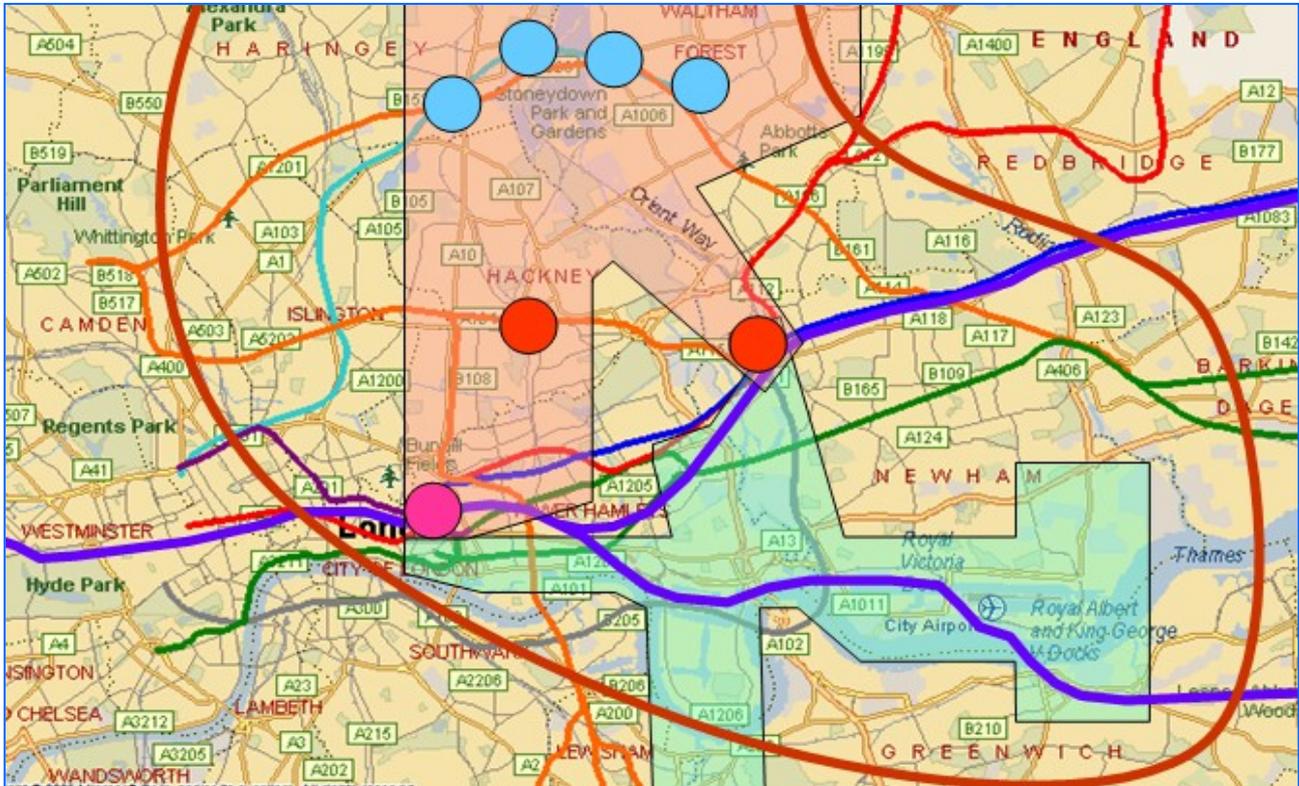


Turning round the past decades of industrial decline and creating a new high-value and socially cohesive economy is the underlying task for the stakeholders, with transport a vital component.

NB: This report intermixes the varied spellings of Lee and Lea, according to the local context.

## Part 1 — TRANSPORT AND THE LEA VALLEY

The map below shows the limited availability of tube (Victoria Line) and Overground north of Stratford. DLR (turquoise zone) ends at Stratford:



This puts huge reliance on the main line West Anglia Routes (pink zone) to serve the Upper Lee Valley. Yet there are numerous constraints on the Lea Valley main line:-

- Only a 2 track railway with flat junctions not grade separated
- Level crossings
- A complex mix of express, limited stop and local services
- Inadequate rail infrastructure to allow a turn-up-and-go local urban service.

This results in the inability to provide a good enough local service to attract residential and business developers and encourage people to use rail as the main form of transport.

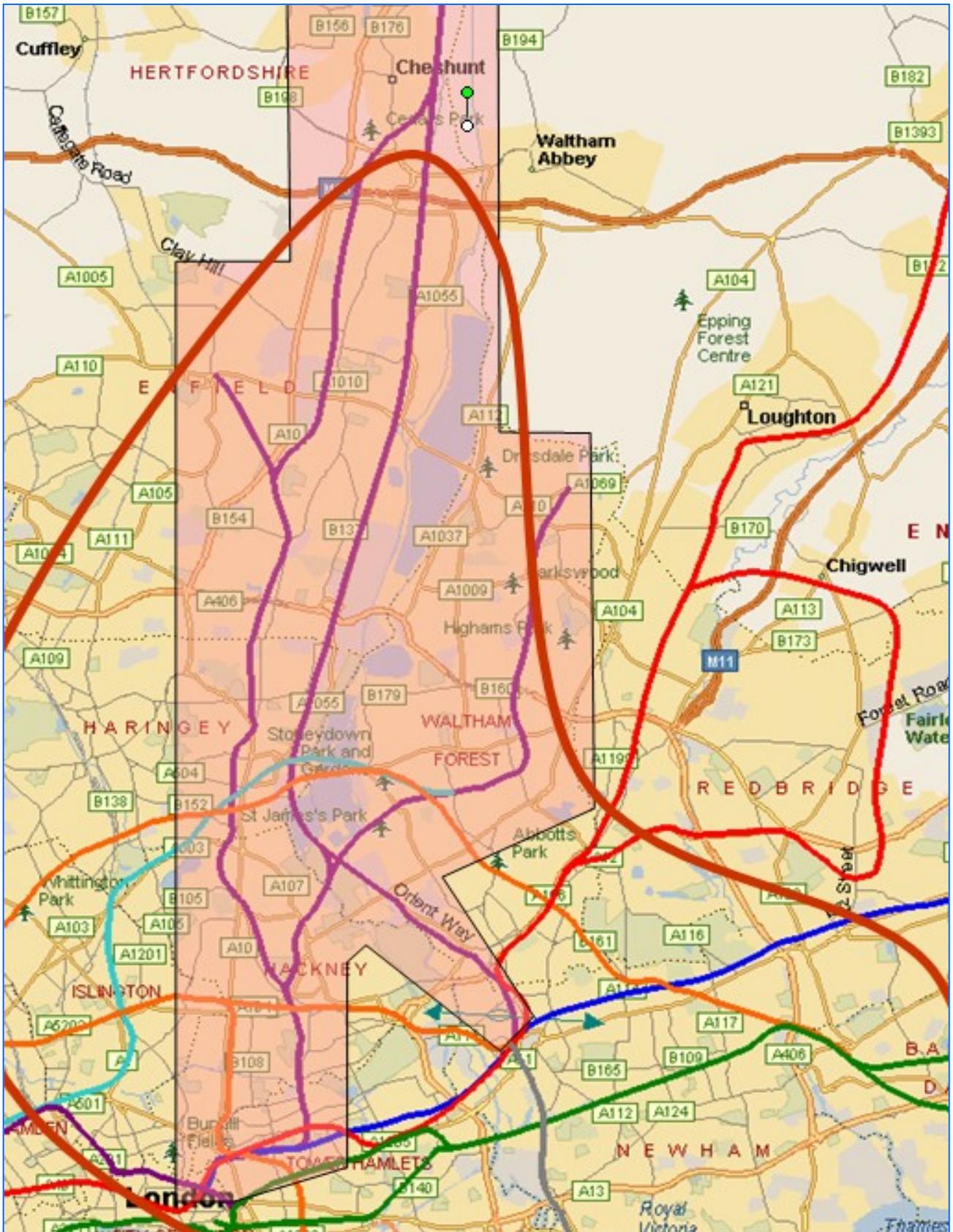
When combined with congested local and main roads, this puts the area at a disadvantage for regeneration compared with other parts of London. This is a zone which is heavily dependent on better transport infrastructure and reshaped local services in order to be able to succeed in the next decade and beyond.

At the London level proposals have been developed and were launched in autumn 2011 for the Upper Lee Valley Opportunity Area Planning Framework (OAPF). This extends from the northern Greater London boundary as far as Lea Bridge. This proposes 15,700 homes and 21,900 jobs in the period from 2014 to 2031 with up to 15,000 jobs in adjoining areas.

Part of Waltham Forest is in the Upper Lee Valley and this reinforces the need for better catchment access to Lea Valley local stations as well as strengthening the case for reopening Lea Bridge station.

## Part 1 — RAIL AND THE UPPER LEE VALLEY

The map below shows the Upper Lee Valley and the West Anglia Routes catchment.



## Part 2 — REOPENING LEA BRIDGE STATION

### Services and journey times

Lea Bridge previously had a station on the Stratford to Tottenham Hale section of railway. This closed in 1985 when the bulk of local trains were diverted elsewhere. Regular local services resumed between Stratford and Tottenham Hale in 2005 and were improved in December 2011 with a 2 trains per hour service from Stratford to Hertfordshire.



There are also plans, see later, for a turn up and go 4 tph service. Reopening the station would allow it to serve the local part of both the Upper and Lower Lea Valley . This would also include serving the new jobs and homes in the south-west Waltham Forest area. There is currently no station within three-quarters of a mile.

Lea Bridge will be 5 minutes by rail to Stratford or Tottenham Hale interchanges, so offers good access to Central London and elsewhere.

### Demand and cost estimates

Estimates by Transport for London (TfL) show 352,000 entries and exits annually by 2031 with 2 tph, many more if 4 tph: 1.2-1.3 million yearly depending on growth forecasts. Station capital costs are forecast by consultants as £4.8m-£5.4m, fitting available capital grant-aid from Westfield (section 106 funds).

The cost of reopening the station is mostly covered as are the running costs. The project achieves a high benefit-cost ratio (BCR). TfL has assessed that even if the station cost far more it would still achieve a BCR of 2:1.

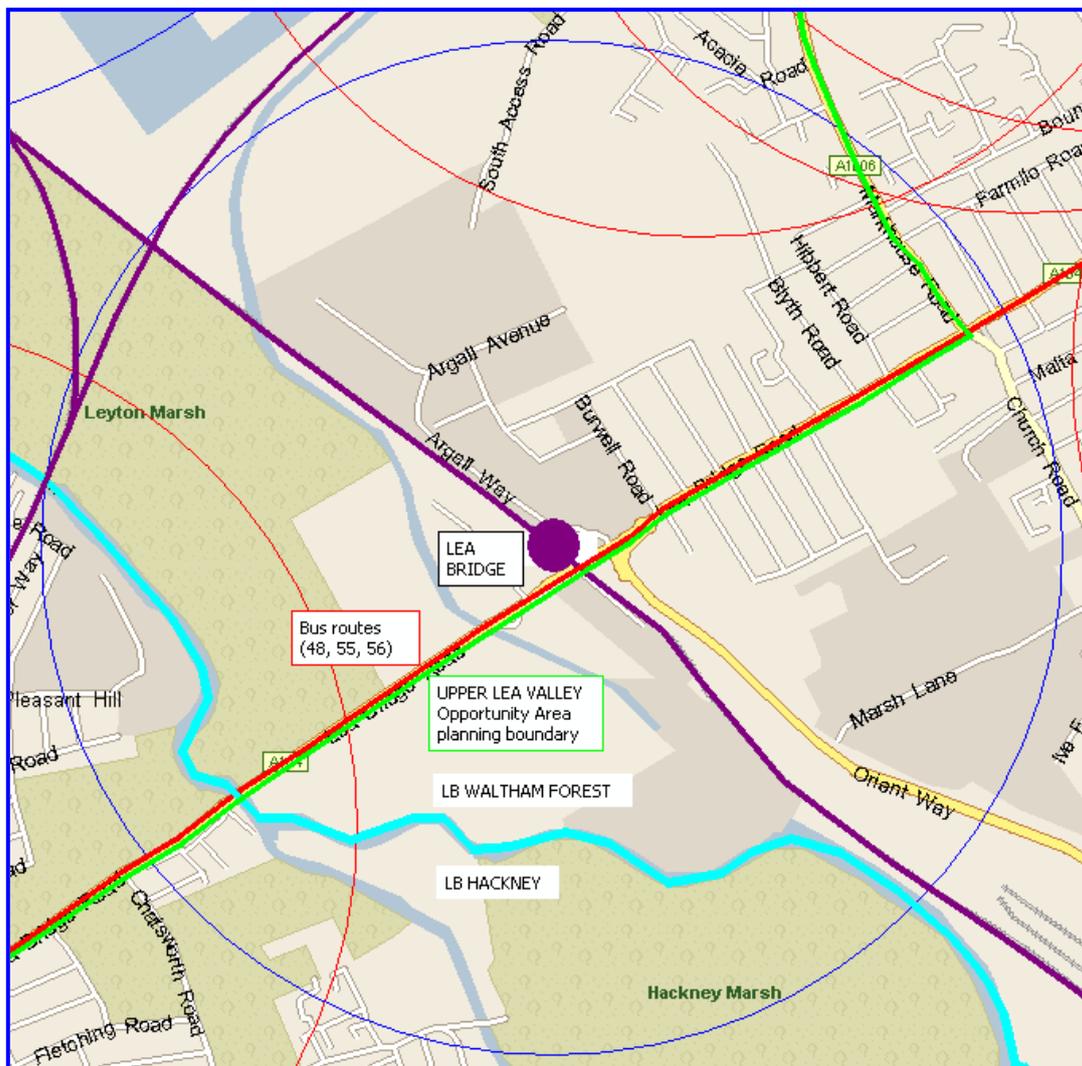
### Project progress and next steps

LB Waltham Forest began work on a business case in 2011 in partnership with other Lea Valley stakeholders and TfL. The business case is now nearing completion and it is intended to seek approval for the project by the end of 2012.

This fits with the section 106 timetable which requires go ahead by the start of 2013. It is hoped to open the station during 2014.

## Part 2 — REOPENING LEA BRIDGE STATION

Blue circle shows 1 Kilometre radius from Lea Bridge Station (red circles 1KM from other stations)  
The buses link to Leyton and Clapton.



The table below shows most of the Lea Bridge Station catchment has high levels of multiple deprivation compared to the rest of England - not just London.

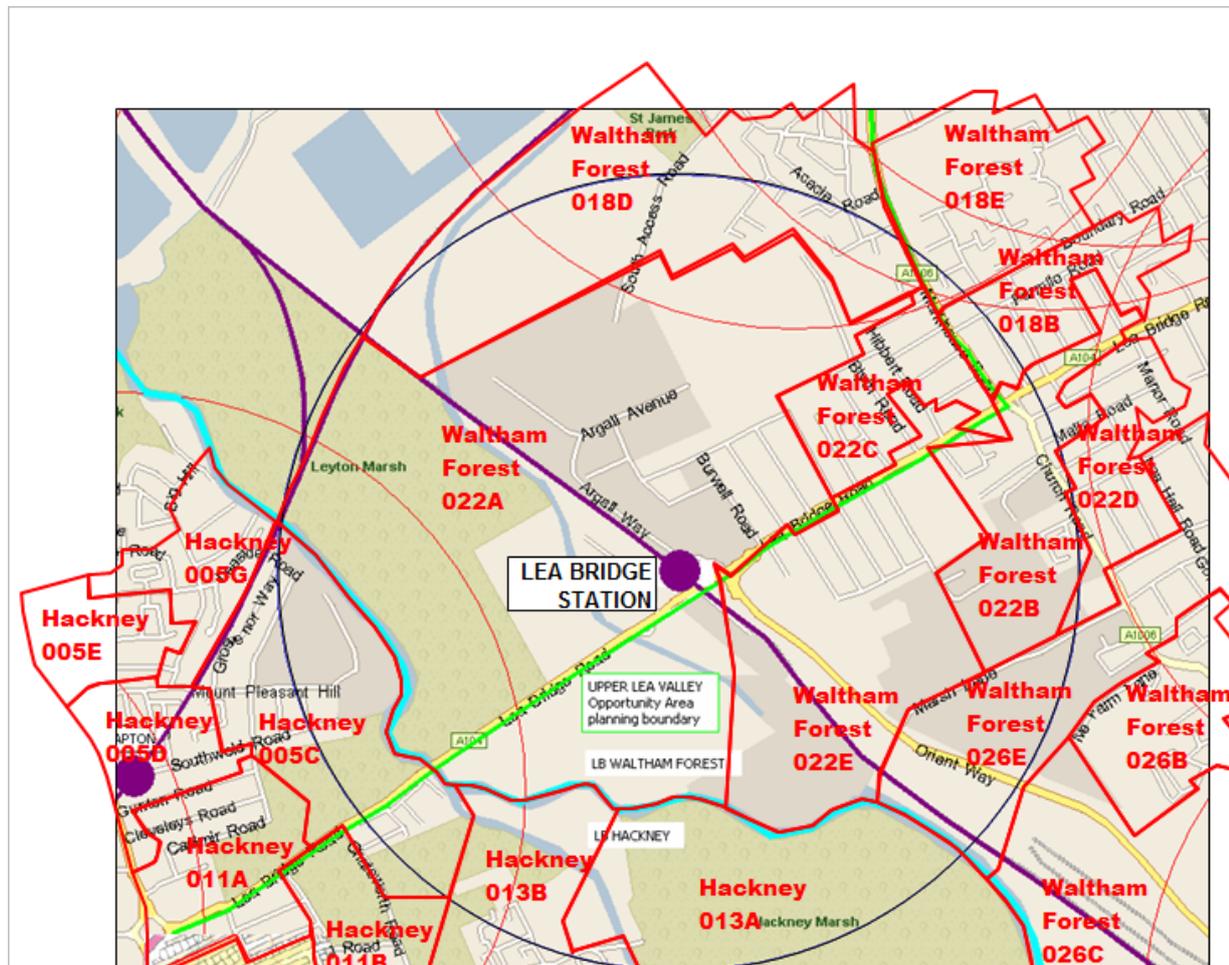
Lower level Super Output Area data (LSOA)					Pink	Orange	Yellow =
Index of Multiple Deprivation (IMD) 2010 data					= worst 5%	= worst 6-10%	worst 11-20%
Lower Super Output Area	IMD overall rank in 2010 (best 32,482)	Employment rank	Health / disability rank	Educ skills & training rank	Access to Housing & services rank	Crime score rank	Living environment rank
Waltham Forest 18B	7,379	14,109	16,325	16,057	1,399	3,065	4,227
Waltham Forest 18D	5,714	7,536	9,465	14,759	1,306	7,296	3,010
Waltham Forest 22A	6,145	11,673	11,129	15,034	844	2,818	2,822
Waltham Forest 22B	3,834	6,633	7,065	15,588	717	4,751	1,636
Waltham Forest 22C	6,161	16,735	13,228	18,440	1,203	7,858	77
Waltham Forest 22E	4,986	13,394	14,310	10,471	333	3,935	230
Waltham Forest 26E	6,784	10,308	13,936	12,449	771	10,239	4,889
Hackney 5C	4,374	7,431	8,353	16,247	463	10,462	3,724
Hackney 13B	2,183	3,181	8,075	7,010	1,228	15,719	8,246

Hackney 5C and 13B depend on station access routes

## Part 2 — REOPENING LEA BRIDGE STATION

This table shows that in 2010 there were over 2,000 people of working age receiving benefit. Nearly 600 were jobseekers. Among those working, the average distance to work was about 6 miles. Travelling this far to work creates a high reliance on reliable and easy access to major destinations and interchanges.

Lower Super Output Area employment statistics							
Lower Super Output Area	local population in 2010	No. with jobs	Working from home	avge km to work	Tube, train, bus etc	Working age, on benefits	Job-seeker
Waltham Forest 18B	1802	658	40	8.15	312	205	60
Waltham Forest 18D	1573	701	31	9.17	343	190	55
Waltham Forest 22A	1407	628	48	9.63	285	195	50
Waltham Forest 22B	1693	613	35	10.88	304	260	70
Waltham Forest 22C	1514	805	35	9.68	483	195	50
Waltham Forest 22E	1533	714	38	8.21	387	175	70
Waltham Forest 26E	1776	707	46	10.67	328	225	60
Hackney 5C	2081	597	54	11.58	294	430	110
Hackney 13B	1454	410	23	7.95	206	250	60
<b>totals</b>	<b>14,833</b>	<b>5,833</b>	<b>350</b>	<b>9.64</b>	<b>2,942</b>	<b>2,125</b>	<b>585</b>
		Apr-01	Apr-01	Apr-01	Apr-01	Nov-10	Nov-10



## Part 3 — BETTER LEA VALLEY RAIL SERVICES

### Changes in the Upper Lee Valley

The Upper Lee Valley (ULV) Opportunity Area extends from Greater London's edge as far as Lea Bridge. It crosses local authority boundaries. There is much deprivation and industrial downturn, related to rioting in parts of this area of London in August 2011

The criticality of local rail services and cross-valley routes is highlighted.

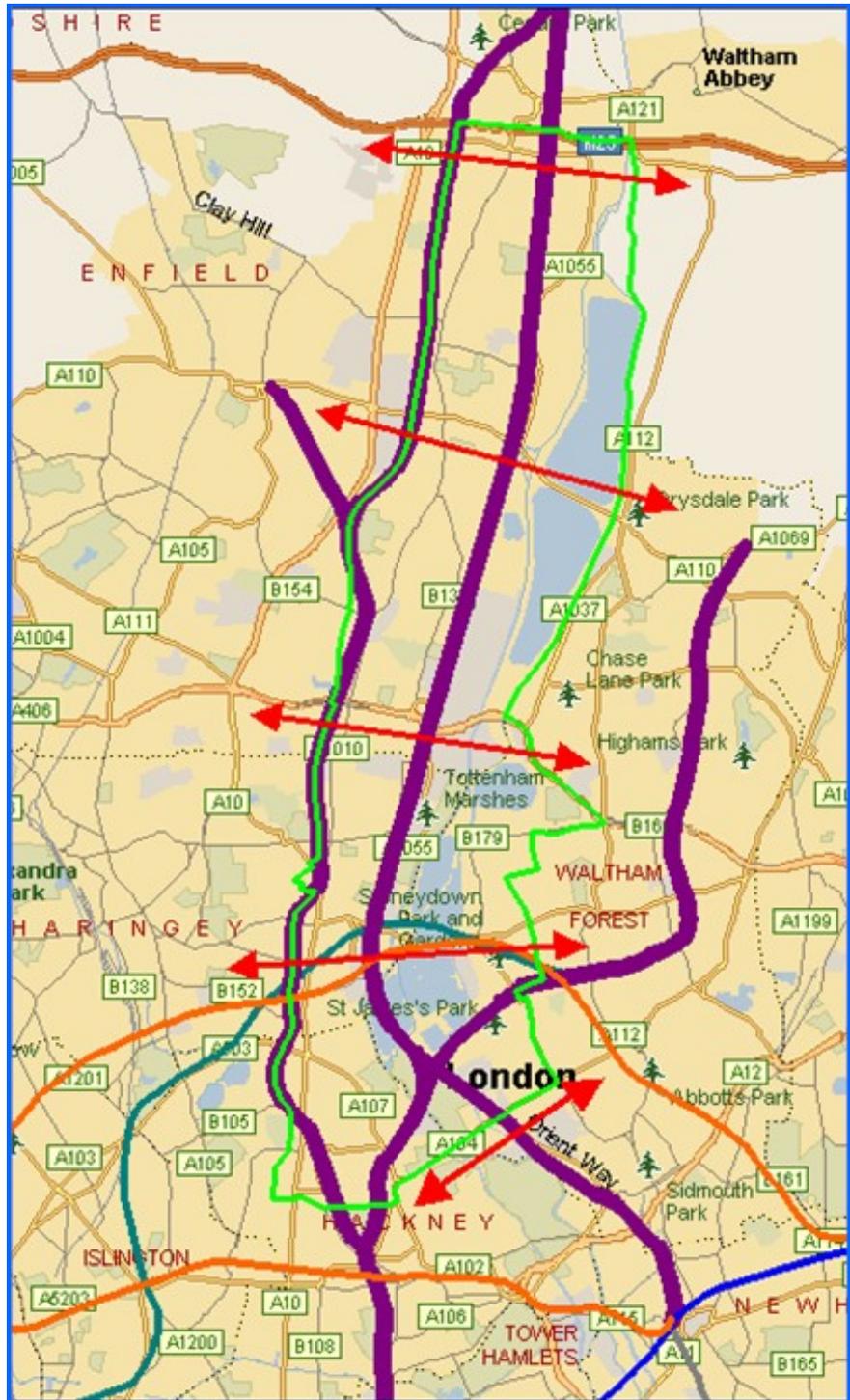
**Green:** ULV plan boundary.  
**Red:** cross-Valley roads.

The Upper Lee Valley Authorities are working to transform the economy and spatial patterns of the Valley, as discussed already.

The 'Opportunity Area Planning Framework' created by the Greater London Authority, in consultation with all partners, will achieve an uplift to the UK economy of over £4.5 billion by 2021 and over £10.7 billion by 2031 (*Oxford Economics 2012*).

### Options for local rail improvements

The ULV assessments recognise the importance of greatly improving the local services along the Lea Valley main line, through the heart of the regeneration area. New jobs, schools and homes are planned for 2014 onwards.



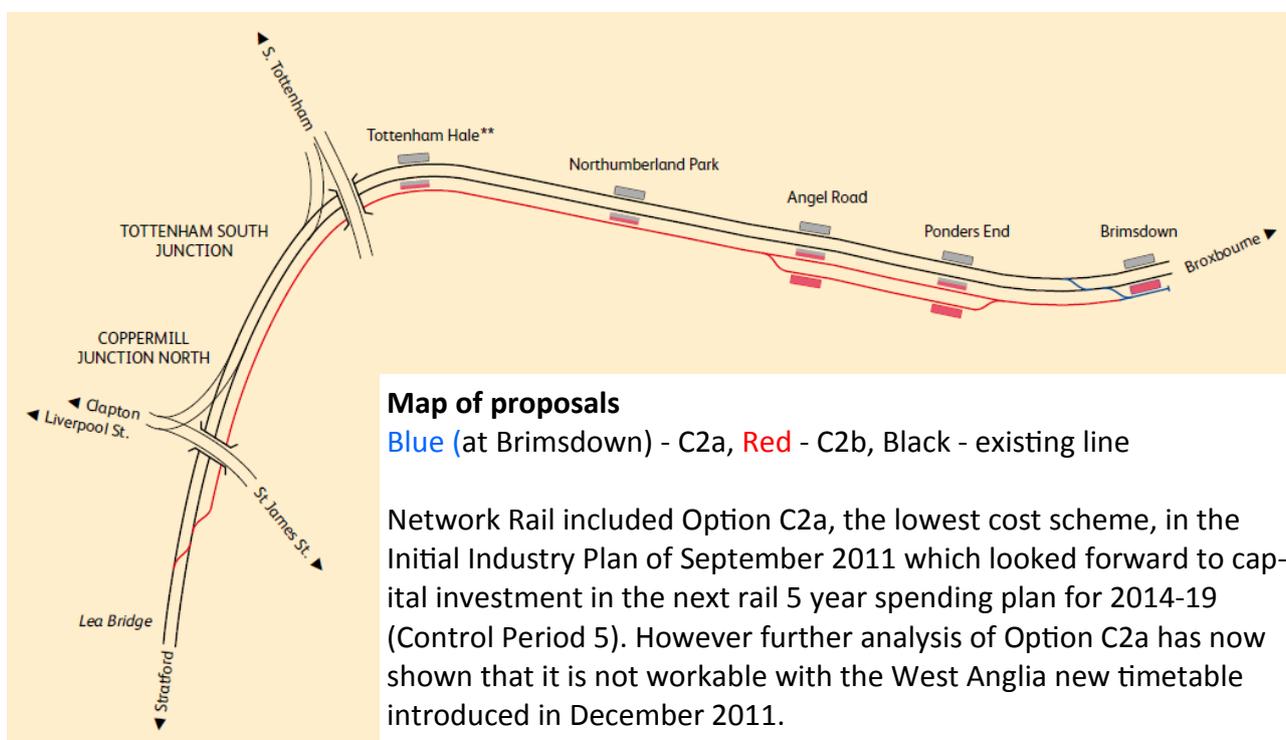
It is vital that a turn-up-and-go service is in place by early 2016, to Angel Road, that developers and new residents will trust. Also, Northumberland Park serves some of the most deprived communities in the whole of England, with up to 29% unemployment. It merits improved services to 4 tph, for inward investment for the Tottenham Stadium redevelopment.

## Part 3 — BETTER LEA VALLEY RAIL SERVICES

### Service Options - in brief

Studies by Network Rail, Transport for London, the West Anglia Routes Group and LB Enfield point to the need for additional track and signalling to achieve this. A range of options was looked at in 2011. This led to proposals in the July 2011 London and South East Routes Utilisation Strategy (LSE RUS) for schemes which offered a new 4 trains per hour turn-up-and-go service for local stations between Stratford, Tottenham Hale and Brimsdown.

- **Option C2a** - a local shuttle relying on existing slots between other trains and a reversing siding at Brimsdown
- **Option C2b** - a separate local track from north of Lea Bridge to Brimsdown
- **Option C3** - a higher 6 trains per hour frequency from Stratford



Lea Valley stakeholders are keen to see Option C2b introduced when this is affordable but recognise that short term financial constraints are likely to require an initial interim scheme which costs less than the full C2b.

Tested against the new December 2011 timetable, the most likely solution which is both affordable and workable is a third track, to provide a reliable, regular interval service.

Affordability during 2014-19 points to an interim objective of 4 tph as far as the proposed sub-regional centre at Meridian Water, by Angel Road station and the A406 North Circular Road link with Waltham Forest.

### Service Options - in more detail

#### Option C2a:

- 4tph between Stratford and Brimsdown
- a very high Benefit Cost Ratio of over 11 : 1, for £25-35m
- included in the September 2011 Initial Industry Plan, for 2014-19 investment  
BUT
- limited additional infrastructure (siding at Brimsdown, power upgrade), so reliant on existing main line infrastructure and operations, with performance risks
- skip-stop irregular interval service at intermediate stations
- analysis based on earlier West Anglia timetable, achieves much fewer outputs with new 2011 timetable <sup>1</sup>
- potential variant with a centre-reversing siding is not compatible with further 3/4 tracking at Brimsdown.

#### Option C2b:

- 4 tph between Stratford and Brimsdown
- a strong Benefit Cost Ratio of 2.7 : 1, for £232-247m
- referenced as a fallback option in the July 2011 LSE RUS, for 2014-19 investment
- third track between north of Lea Bridge and Brimsdown, with a fourth track between Angel Road and Ponders End to allow trains to pass
- full 4tph service possible as the third track allows local trains to stay clear of the Lee Valley main line
- the RUS says “it would represent high value for money, in the absence of other options to deliver similar outputs”  
BUT
- some uneven intervals between trains
- main issue is that it is unaffordable with pressures on Network Rail’s budget.

#### Option C3:

- is C2b with extensive fourth track to allow high frequency, to 6tph to Stratford
- has a high BCR, within 0.2 percentage points of C2b  
BUT
- at least a further £24m investment
- affordability will be a bigger constraint.

In summary, the systematic 4tph output is not achieved with C2a, while C2b and C3 are not affordable.

**Conclusion: delivery options in-between C2a and C2b require study.**

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<sup>1</sup> Even with the previous timetable, the service was “not ideal”, according to the LSE RUS. “Not all stations in the Lower Lee Valley would be able to receive a 4tph service at all times of the day, due to the constraint posed by the Lee Valley line still remaining as two tracks. Some stations would also have uneven intervals between trains... [the timetable] has not at this stage been demonstrated to the satisfaction of industry stakeholders as operationally robust... passengers using stations in the lower Lee Valley would only see limited benefits from this option.”

## Part 3 — BETTER LEA VALLEY RAIL SERVICES

### STAR: Stratford-Tottenham-Angel Road

Local authorities propose six outputs for the interim Lea Valley local services:

- Core, regular interval 'turn up and go' 4 tph at all local Lea Valley stations
- 4 tph from Upper Lee Valley via Tottenham Hale and Stratford
- Reopen Lea Bridge station (see section above)
- Close Northumberland Park level crossing and mitigate the local consequences
- Address timetable shortcomings
- Provide an improved passenger experience.

The proposed new service, devised by LB Enfield in consultation with other partners, is called 'STAR' – Stratford-Tottenham-Angel Road'. It is supported by CLUA and Railfuture as the first step in a long-term four-tracking of the Lea Valley main line to Broxbourne.

Extra local trains will run northwards on a third track from south of Coppermill Junction, to keep them clear of the main line from north of the junction. There would be additional local platforms on this track. Authorisation to start work at the beginning of 2014-19 (Network Rail's investment Control Period 5) would allow the STAR service to run from the December 2015 timetable, in time for early developments especially at Meridian Water.

North of Tottenham Hale, the foreseen extra residential population and new jobs are cumulatively estimated as:

2014-19	+3,200 residents	+3,500 new jobs
2014-24	+6,300 residents	+5,500 new jobs.

### CLUA and Railfuture further priorities

**Improve station standards and accessibility:** Lea Valley stations were mostly rebuilt in the late 1960s to a basic standard. A different priority is needed for station standards and staffing, eg London Overground's standards. In addition, Angel Road is highly inaccessible, despite major retail centres such as IKEA. There are already proposals to upgrade Tottenham Hale station access.

**New trains:** The Class 315/317 trains are life-expired. CLUA/Railfuture seek new trains for a new local service eg Overground Class 378.

**Better services at key stations:** 4 tph at all local stations is the objective. For interim services to 2019, 4 tph is vital at Angel Road, Northumberland Park and Lea Bridge stations (see table opposite).

**Access across the Valley:** The 'natural' catchment of the local main line stations extends across the Lee Valley Regional Park into Waltham Forest's communities.

Combining improved bus and cycle interchange at Lea Valley main line stations with better local rail service frequencies to 4 tph turn-up-and-go standard, will open up an eastern catchment for these stations, not just westward.

## Part 3 — BETTER LEA VALLEY RAIL SERVICES

The table below shows proposed access and interchange gains:

<b>Upper Lee Valley (ULV): rail interchange with other modes (all stations to have disabled access)</b>				
<b>Station</b>	<b>mode</b>	<b>ULV peak trains/hour</b>	<b>ULV off peak trains/hour</b>	<b>ULV long term</b>
Brimmsdown	rail	4 tph	2 tph min	4 tph all day
	bus	closer proximity of bus stops to station		
Ponders End	rail	4 tph	2 tph min	4 tph all day
	bus	reroute cross-Valley 313 bus via station		
Pickett's Lock	rail	new station 2020s, longer 3rd track		4 tph all day
	bus	191, W8 buses to serve station		
Angel Road	rail	4 tph	4 tph	+outer-suburban
	bus	reroute cross-Valley 34, 444 buses via station		
Northumberland Park	rail	4 tph	4 tph	4 tph all day
	foot/cycle	'green' route across LV Park to Higham Hill		
Tottenham Hale	rail	all services call, min. 4 tph local trains to Angel Road		
	bus	re-organise Gyrotory to speed bus access to station		
Lea Bridge	rail	4 tph	4 tph	4 tph all day
	bus	close proximity of bus stops to reopened station		

The effective catchment for Lea Valley local stations will be expanded into Waltham Forest's communities, by creating direct and in some cases new interchange between local buses and the West Anglia stations. For example, it will be faster to Central London via Angel Road from Chingford Mount, than via Chingford or Walthamstow Central. A direct 'green route' – footpath and cycleway – across the Lee Valley from Northumberland Park, can also speed journeys between Central London, Stratford and Higham Hill.

### Services and journey times

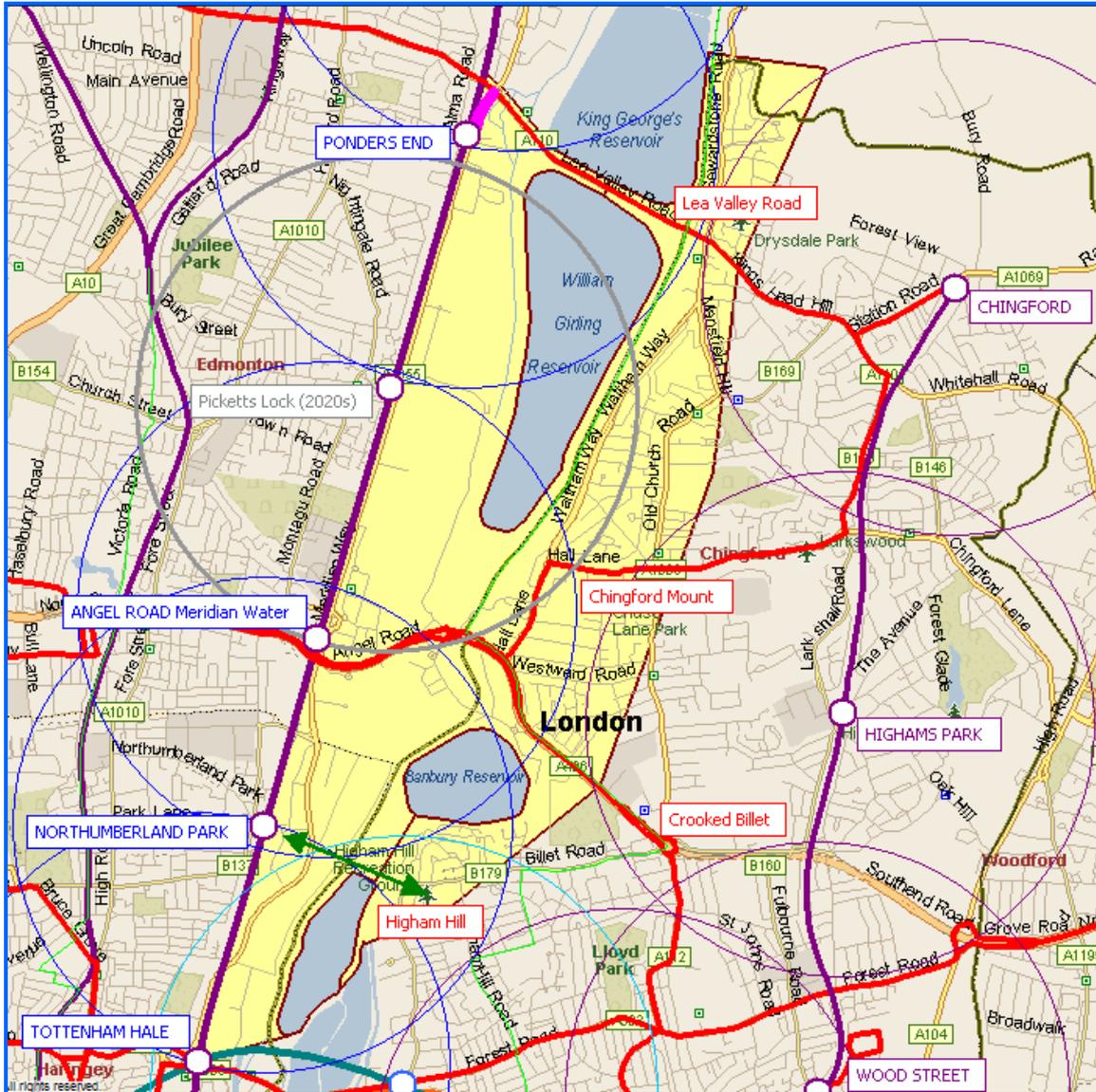
To achieve 4 local trains per hour, the STAR service specification is for 2 local trains per hour between Stratford and Hertfordshire/Essex (these exist already), and 2 additional trains per hour between Stratford and Angel Road (Meridian Water). The reasons are:

- Provide by 2016 a regular interval, turn-up-and-go service at the stations serving the top priority regeneration and economic development zones in the Upper Lee Valley.
- West Anglia route capacity at Liverpool Street is fully absorbed by the existing 22 peak trains per hour and contra-flow operations, so any additional Lea Valley trains have to start at Stratford and run via Tottenham Hale.
- After Crossrail's opening in 2019, Liverpool Street's released capacity is generally intended for use by Great Eastern not West Anglia trains. The Stratford-Tottenham-Lea Valley corridor remains the local service priority, with passengers using these principal stations to interchange with other London rail corridors.
- Avoid additional operational pressures on the existing 2-track main line between Central London and Hertfordshire, and achieve a well-spaced local timetable.

## Part 3 — BETTER LEA VALLEY RAIL SERVICES

### Catchment for Lea Valley local stations, using bus links and green routes:

Map shows extended 1 mile catchment circles, and connecting buses to Lea Valley stations:



The Stratford-Tottenham line can be busy with freight trains in the off-peak, while during the peak margins there are empty passenger trains between Liverpool Street, Stratford and the Greater Anglia depot at Leyton Orient Way. Consequently the proposed STAR timetable inter-works the Hertfordshire/Essex and Angel Road services, to limit line and platform occupation at Stratford and minimise the number of additional trains required.<sup>2 3</sup>

<sup>2</sup> Slotting more trains on the existing 2 tracks north of Coppermill (the junction for the London and Stratford lines) is (a) not possible on a consistent basis, (b) increases the risk of service dislocation, (c) would have a closely spaced interval between local trains followed by a long gap, (d) would not allow local trains to call at all stations.

<sup>3</sup> Variation to the present timetabled stops would be required at peak and off-peak times on the Hertfordshire trains, to achieve the required 4 tph output at Angel Road and Northumberland Park.

## Part 3 — BETTER LEA VALLEY RAIL SERVICES

Sample off-peak journey times including waiting and interchange are shown below:

Journey times based on 15 minute intervals on Stratford - Tottenham - Angel Road

ANGEL ROAD (Meridian Water)					
2.5	NORTHUMBERLAND PARK				
5	2.5	TOTTENHAM HALE			
13	8	5	LEA BRIDGE		
15	13	10	5	STRATFORD	
5 minutes interchange/waiting time at Tottenham Hale or Stratford					
<b>Total station to station time including waiting and final journey</b>					via
38	36	33	28	CANARY WHARF	Jubilee
41	39	36	31	LONDON CITY AIRPORT	DLR
58	56	53	48	LEWISHAM	DLR
30	27	17	26 Stfd	LIVERPOOL STREET	Tott.Hale
70	68	56	60	HEATHROW CENTRAL	Crossrail
22	19	6	22	WALTHAMSTOW CENTRAL	Victoria
30	27	14	30	KINGS CROSS ST PANCRAS	Victoria
35	32	19	35	OXFORD CIRCUS	Victoria
39	36	23	39	CAMDEN ROAD	Overground
45	42	29	45	WEST HAMPSTEAD	Overground

### North of Angel Road

Local stations between Angel Road and Broxbourne are at Ponders End, Brimsdown and Enfield Lock in Greater London, and at Waltham Cross and Cheshunt in Hertfordshire. Current service frequencies, and current gaps for a 'turn up and go' service, are:

Lea Valley Rail services	AM peak	Day offpk	PM peak	MF eve	Saturday	Sunday	Main terminus
<i>trains per hour each way</i>							
	<i>&gt; = to London/Stratford, &lt; = from London/Stratford</i>						
<b>Northumberland Park</b>	2	1	2	1	1	0	Stratford
<b>Angel Road</b>	1	0	1> 2<	0	0	0	Stratford
<b>Ponders End</b>	2	2	2	2	2	1S	Liverpool Street
<b>Brimsgdown</b>	5> 2<	2	2	2	2	1S	Liverpool Street
<b>Enfield Lock</b>	4 (2L, 2S)	3 (2L, 1S)	4 (2L, 2S)	3 (2L, 1S)	3 (2L, 1S)	1S	LivSt/Stratford
	5> (3L, 2S)		4< (2L, 2S)				
<b>Waltham Cross</b>	3< (2L, 1S)	3 (2L, 1S)	3> (2L, 1S)	3 (2L, 1S)	3 (2L, 1S)	1S	LivSt/Stratford
<b>Cheshunt</b> (excl. trains via Edmonton Green)	6 (4L, 2S)	6 (4L, 2S)	6 (4L, 2S)	6 (4L, 2S)	6 (4L, 2S)	4 (3L, 1S)	LivSt/Stratford

With the existing 2 track limitations, this may take time to put right. However, better peak services are an early desired output at Ponders End and Brimsdown. At present, just Brimsdown has an increased service, in the morning peak with-flow direction only.

At all stations, the 'rural' level of service on Sundays is completely unacceptable and also should be aiming to achieve 4 tph as soon as Network Rail can devise a better engineering strategy than its present way of managing line possessions.

## Part 3 — BETTER LEA VALLEY RAIL SERVICES

### Demand and cost estimates

Consultants JMP forecast in 2009 a combined AM 3-hour peak demand for over 7,000 rail journeys boarding or alighting at Northumberland Park, Angel Road, Ponders End and Brimsdown stations by 2026, providing there was a 4tph service.<sup>4</sup> This compared with 3,200 without such a service. Angel Road's usage was negligible without better access and 4tph.

Since then, spatial planning within the Upper Lee Valley Opportunity Area Planning Framework has given greater emphasis to Meridian Water as the new sub-regional town centre, by Angel Road station, with an important link to Waltham Forest via the A406. About 75% of all major job and population growth would be in Angel Road's catchment in 2014-2019. So better rail services here are a 'must have', in time for initial developments, beginning in 2014, to be open by 2016.

Forecasting of station usage has relied partly on the baseline of existing passenger traffic. Office of Rail Regulation (ORR) figures for local station entries and exits are shown to be seriously underestimated, in counts undertaken by JRC and funded by the West Anglia Routes Group and Enfield Council at Lea Valley local stations in Autumn 2010 and 2011. The counts were moderated by Transport for London. The evidence below shows that we can be positive about a greater passenger demand than forecast previously.

<b>Stratford-Lea Valley Rail</b>	<b>annual entry/exit</b>	<b>annual entry/exit</b>	
	<b>ORR 2010-11</b>	<b>WARG 2011</b>	
Stratford LV	1,048,741	1,376,836	+31%
Lea Bridge	-	-	-
Tottenham Hale	3,831,805	6,456,820	+69%
Northumberland Park	176,456	239,763	+36%
Angel Road	28,646	40,282	+41%
Ponders End	259,820	691,328	+166%
Brimsgate	465,520	1,031,298	+122%
Enfield Lock	779,548	1,540,221	+98%
	6,590,536	11,376,548	+73%
At Stratford, ORR number is % of total, based on West Anglia % of main line trains			
WARG Autumn 2011 count reduced by 6.2% to rebase to 2010-11, and by 5% for seasonality			

There are three other strong indicators:

- Transport for London identified a 2.7 to 1 Benefit Cost Ratio for Option C2b (Stratford-Brimsgate). This is defined as high value for money by the Department for Transport.
- Oxford Economics, in a 2012 report, showed that the Gross Value Added from better local rail services is worth £15m a year more in 2016, and £31m more by 2021.
- JRC has estimated from this that a better rail service pays for itself in GVA alone by 2021, including covering capital and operating costs and paying a regulated return on assets.<sup>5</sup>

Capital costs are ca. £72-81m, based on Transport for London cost elements for rail projects. This includes a 120% uplift for project risks. The £72m is essentially for an extended, independent siding for 2.9 miles from south of Coppermill Junction, with third platforms at Tottenham Hale,

<sup>4</sup> Enfield Core Strategy Transport Assessment, Final Report, JMP, November 2009

<sup>5</sup> Investment and Regeneration in the Lee Valley Corridor, Oxford Economics, January 2012

## Part 3 — BETTER LEA VALLEY RAIL SERVICES

Northumberland Park and Angel Road, and closure of Northumberland Park level crossing with a replacement pedestrian and cycle bridge over the tracks. An additional £9m buys a fourth platform and track at Angel Road, if a third train were required to guarantee a 4 tph service at stations north of Tottenham Hale. A service diagram is shown on the outside back cover.

### Project progress

- The proposal for a third Lea Valley track for local services came from a report to Enfield Council in April 2010 on train service options with Greater Anglia refranchising.<sup>6</sup>
- The proposition was assessed by Transport for London during 2010, and adopted as an interim stage towards the objective of 4 tracking the West Anglia line to Broxbourne.
- It was included in the interim and final reports on Route Utilisation Strategy in London and the South East, published in 2010 and 2011 by Network Rail, with options including C2a, C2b and C3, discussed earlier.<sup>7 8</sup>
- A low-cost Option C2a, and funding for it, was budgeted in Network Rail's Initial Industry Plan in September 2011.<sup>9</sup>
- Lea Valley stakeholders support a completely independent track north from Coppermill Junction to avoid the existing main line, i.e. C2b or equivalent outputs. They recognise that funding limits during 2014-19 (Network Rail's Control Period 5) will not afford the full Option C2b.
- Stakeholders are therefore advocating a shorter 'STAR' local service initially: Stratford-Tottenham-Angel Road. This was published in the May 2012 Upper Lee Valley Conditional Outputs Statement.
- Timetable modelling by Network Rail has now shown that its Option C2a cannot interwork with the new December 2011 West Anglia timetable. Network Rail is now exploring other options, including the third track scheme.

### Next steps

- The Government announces its funding limits and preferred rail projects for 2014-19 in June/July 2012, with the High Level Output Specifications and Statement of Funding Available. It is trusted that improved Lea Valley rail services will be part of this package.
- Beginning in August 2012, the Office of Rail Regulation (ORR) will consult on Network Rail's outputs for 2014-19 (it has already provided formal advice at high level on outputs and funding).
- Agencies will then need to finalise the affordable proposals, including clarity on how such projects will be fully funded if there are capital or revenue gaps.
- Network Rail will then submit its Strategic Business Plan (its full spending programme) in January 2013, for consideration by ORR during its 2013 Periodic Review.
- ORR will publish its Draft Determination in June 2013, and Network Rail will respond in September.
- The final determination is due in October 2013 followed by a published list of access charges. Network Rail publishes its delivery plan in March 2014.
- Control Period 5 begins on 1 April 2014, though some schemes might be funded to start before that date.

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<sup>6</sup> Train service operations within LB Enfield with Greater Anglia refranchising, JRC, April 2010

<sup>7</sup> London & South East Route Utilisation Strategy Draft for Consultation, Network Rail, December 2010

<sup>8</sup> London & South East Route Utilisation Strategy [Final Report], Network Rail, July 2011

<sup>9</sup> Initial Industry Plan 2011 England and Wales, Network Rail, September 2011

## Part 4 — CHINGFORD LINE ACCESS TO STRATFORD

### Stratford as a destination and interchange

The diagram on the outside back cover highlights that the Liverpool Street-Chingford Line avoids Stratford. Stratford is now an important destination in its own right. It is also a major interchange with direct services as far as Norwich, Ramsgate and Dover, and the London regional catchment including cross-river via Docklands Light Railway to Lewisham and Woolwich.

The Office of Rail Regulation numbers for 2010-11 passenger use of Stratford put it as the 20<sup>th</sup> busiest national rail station in Britain, at 17,479,000 entries and exits. A further 1,657,000 are estimated to interchange between national rail services. Also, Stratford International now adds ca. 400,000 more entries and exits yearly.

A table combining National Rail, London Underground and DLR data is set out below. There is double-counting as passengers interchange between the different operators' services, but the figures serve to restate the station's importance, which has accelerated prior to the 2012 Olympic Games – and their development legacy. The figures below are also prior to Westfield Stratford opening. By any measure, this is one of the busiest station complexes in Britain, with 75 million passenger 'journey stages' recorded in 2010-11:

Stratford and Stratford International station usage						
<i>entries and exits plus interchange</i>	<i>services</i>	2010-11	2009-10	2008-09	2007-08	2006-07
National Rail (ORR estimate)	c2c, Great Eastern, London Overground, West Anglia	new basis: 19,136,000	13,753,000	13,446,000	14,187,000	13,453,000
High Speed 1 (Stfd. International)	South Eastern high speed	409,000	69,000	< opened December 2009		
London Underground	Central and Jubilee Lines	48,570,000	29,820,000	26,990,000	27,230,000	25,627,000
Docklands Light Railway	pre 2012, via Poplar only	6,890,000	6,021,000	5,106,000	n/a	n/a

### Linking the Chingford Line to Stratford

The summary above shows the desirability of Stratford as a destination and interchange. Are there then good reasons to serve Stratford directly from the Chingford Line? This is a desire by the Chingford Line Users Association, and has been reviewed already by Network Rail.

An indicator is provided by the recent reopening of the West Anglia route to Stratford. West Anglia passenger services reconnected with Stratford in December 2005, after a gap of 20 years. There was a restricted service of 2 tph in peaks and 1 in the off peak, provided by Lea Valley trains via Tottenham Hale. In December 2011 this grew to 2 tph all day except Sundays (1 tph). The Lea Valley Rail proposals described above will increase this to 4 tph when plans are successful.

The most recent station count at Stratford Lea Valley platforms was by JRC in October/November 2011, for the West Anglia Routes Group. Traffic had grown overall from an estimated 1.25m in Autumn 2010 to 1.46m, 17% up.

## Part 4 — CHINGFORD LINE ACCESS TO STRATFORD

Of this total volume, on-train counts between Stratford and Tottenham Hale showed a 20-50% local travel between those stations, depending on time of day (of course, passengers may have interchanged at Stratford and/or Tottenham Hale). This points to multiple types of travel demand, using Stratford for local business and leisure/retail trips, for more occasional major shopping expeditions, and as a regional interchange for many types of journeys.

By 2021, the catchment of the Stratford-Hertfordshire/Essex and proposed Stratford-Lea Valley local trains will offer a jobs and population volume approaching 150,000, taking just the route to Hertford into account. There would be more when including Harlow and Bishop's Stortford. Doubling of the existing service frequency fits the foreseeable demand.

Let's now look at the Chingford Line. The primary benefit of a Stratford service would be at Walthamstow and northwards, as buses from Stratford serve the southern area of Waltham Forest with higher frequency and catchment density than is possible by rail.

The Chingford Line passes over the Lea Valley line near Coppermill Junction, with no interchange station. Years ago there was the 'Hall Farm Curve', between St James Street station on the Chingford Line and Lea Bridge station in the direction of Stratford. Re-opening this curve at an estimated £36m cost would create the opportunity for a Chingford-Stratford service.

Applying half of Waltham Forest's population would offer a catchment of 115,000. However the stations north of Wood Street serve low to medium density catchments, with 1¼ miles between Chingford and Highams Park, and a further 1½ miles between Highams Park and Wood Street. 1 mile station catchments are shown in the map on the next page, along with the Waltham Forest borough catchment (green boundary) and in red the direct Stratford buses.

The map shows there may be a medium term case for new local stations, to improve access to Walthamstow (Victoria Line) and Stratford. Station options are possibly near Chingford Hatch (east of Chingford Mount) and/or at Hale End (SE of Crooked Billet). Without such stations, there would be 3 to 5 catchments with a direct interest in a through service to Stratford. The effect on through journey times from Chingford to Walthamstow (Victoria Line) and Liverpool Street should be considered if there were additional stations, together with the effect on train loadings to Liverpool Street which are already near to capacity.

### What Chingford-Stratford rail service is possible?

Overall there is a case to assess, for a direct Chingford-Walthamstow-Stratford rail service. Its time may not be until the 2020s, and will need to be reviewed and validated alongside other then-current schemes for improving the Chingford Line. A 2 trains per hour service is what is currently considered to be realistic for assessment, which fits broadly with the available comparative data from the Lea Valley route. It would require 2 additional trains in service.

The starting point is the latest official view of Chingford-Stratford, in the July 2011 London & South East Route Utilisation Strategy (LSE RUS). This looked at an **Option C5** for a Chingford to Stratford service. Option C3 had been for 6tph Lea Valley to Stratford, described earlier and not justified by demand vs costs, while Option C4 was 8tph and even less justified!



## Part 4 — CHINGFORD LINE ACCESS TO STRATFORD

The RUS continued:

*“It is also emphasised that there might eventually be demand for a Lea Valley to Stratford frequency of six trains per hour under **Option C3**, which requires only marginally more infrastructure south of Brimsdown than if **Option C2b** were required. This level of service would utilise all the available capacity at Stratford whilst still being consistent with **Option D2** [through running between the Lea Valley Line and Liverpool Street], so would not be possible if a Chingford to Stratford service was also in operation. This analysis for the Chingford corridor is discussed further in **Option C5** below.”*

<b>Assessment of Option C5 – run 2tph Chingford to Stratford service</b>	
<b>Concept</b>	This option involves construction of a new 'Hall Farm curve' near Clapton station to enable a Chingford to Stratford service.
<b>Operational analysis</b>	This option would enable new services to Stratford from the Chingford route. At Stratford issues would be similar to those discussed under <b>Option C2a/C2b, C3 or C4</b> , depending on the service level.
<b>Infrastructure required</b>	A new chord would be required to connect the Chingford line towards Stratford.
<b>Passenger impact</b>	The Chingford line would receive a new service to Stratford, providing a frequency increase and new connectivity to the Olympic Park area and the Docklands. Passengers from the Chingford route not travelling to Stratford, but instead interchanging with the London Underground Victoria Line at Walthamstow Central for Central London, would also gain through an increase from a 4tph to a 6tph service.
<b>Freight impact</b>	No impact identified.
<b>Financial and economic analysis</b>	The capital cost of the Hall Farm Curve scheme is estimated at £36million. Whilst Chingford to Stratford options have local merits the RUS considers that they would provide passenger benefits over a significantly smaller area than Lea Valley route to Stratford service options. As a result no economic appraisal has been undertaken at present, pending further analysis regarding there eventually being a demand case for a <b>Option C3</b> (6tph Lea Valley to Stratford service).
<b>Link to other options</b>	The conclusion from <b>Option C3</b> was that a 6tph West Anglia to Stratford service is the maximum achievable without preventing resolution of the peak capacity gap on the Great Eastern route. As a result a 2tph Chingford to Stratford service is consistent with a 4tph Lea Valley to Stratford service ( <b>Options C2a or C2b</b> ) but not with a 6tph Lea Valley to Stratford service ( <b>Option C3</b> ).
<b>Conclusion</b>	Due to the benefits of the Lea Valley to Stratford options affecting a wider area this option is not recommended at present. Further consideration is recommended in the light of emerging demand levels for new Lea Valley to Stratford services.

### Into the 2020s

It is clear in the preceding part of this report that there is no quick win for the full Option C2b Lea Valley local service between Brimsdown and Stratford, so Chingford-Stratford is further away. The LSE RUS suggests a choice between 6 tph along the Lea Valley, and 4 tph Lea Valley–Stratford and 2 tph Chingford-Stratford. JRC’s view is that reality is likely to be more blurred – that it will depend on the marginal value for money between different projects, and foreseeable demand pressures and political pressures, at the point that decisions are taken about the merits of including projects X or Y in Control Period 6 (2019-24) or the following Control Period 7 (2024-29).

## Part 4 — CHINGFORD LINE ACCESS TO STRATFORD

Some examples of different scenarios are set out below:

1. Capacity overload on the Chingford line during the 2020s
2. Road congestion in the Stratford catchment, caused by Stratford City, Lower Lee Valley developments and other economic regeneration
3. Crossrail 1 forecasting proving inadequate, with more demand than projected once the line opens in 2018/19
4. Victoria Line bursting at the seams, with no Crossrail 2 deliverable until the early 2030s because of funding and approval delays.

All of these options are plausible, with recent track records to go on. Scenario One is a potential risk, with the West Anglia December 2011 timetable having removed the 5<sup>th</sup> train in the 8-9 AM service sequence from Chingford to Liverpool Street without any direct replacement.

The Chingford Line is now the most exposed to PIXC pressures<sup>10</sup> of all the West Anglia routes, and the foreseen difficulties were described in the 2007 Greater Anglia Route Utilisation Strategy. Almost all peak trains are scheduled as 8 cars using the existing high capacity stock (Class 315). It would only take a further 5-10% change in AM peak demand – plausible with the GLA forecasts to the 2020s – to push the Chingford Line service over the limit. (Though TfL London Rail is not forecasting this to happen before 2021, so it is not proposing new interventions on the Chingford Line by then, in its planning for investment in 2014-19.)

Without more trains (which is not possible with the current line capacity into Liverpool Street), or without any offer of new higher-capacity trains, or longer trains and lengthened platforms (who would fund that, and how much would it cost compared to the £36m to Stratford?), the Chingford Line risks being over the PIXC limit in due course.

It could be a problem during the 2014-2029 lifetime of the 15-year Greater Anglia franchise, which is due to start in July 2014. We don't yet know whether it will be the Department for Transport, or Transport for London, or a combination of the two, who will be the main specifying authority for the Greater Anglia services in the London area from 2014. This may have a bearing on the viable options. One way out may indeed be to run more trains between Chingford and Walthamstow - and then where? To Stratford...

Scenarios 2 and 4 also point in that direction, as capacity relief proposals quite apart from their own travel benefits within East London. On the other hand, Scenario 3 might be adverse, with too many passengers to deal with at Stratford Crossrail – though it is unlikely that a Chingford-Stratford service on its own would be the straw that breaks the camel's back.

In short, the affordability, value-for-money and benefit-to-cost ratio criteria, let alone the political 'sort-the-problem' parameter, may point to Chingford-Stratford during the 2020s. However there will be parallel options. Since Chingford-Stratford will be tested against alternatives during the next planning period towards Control Periods 6 and 7, it is wise to anticipate those and look ahead.

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<sup>10</sup> PIXC – Passengers In eXcess of Capacity – this is a critical area against which Train Operating Companies are measured.

## Part 4 — CHINGFORD LINE ACCESS TO STRATFORD

### Next steps options

The Network Rail RUS processes have concluded, because they were mainly intended to squeeze more capacity from the existing railway. They have been very successful at that, but now bigger infrastructure schemes are starting to be desirable, and need more justification. The new approach is to focus on Long Term Planning, what services are (re-)moveable (rather than accepting all as permanent), and define what new infrastructure then becomes essential or unavoidable.

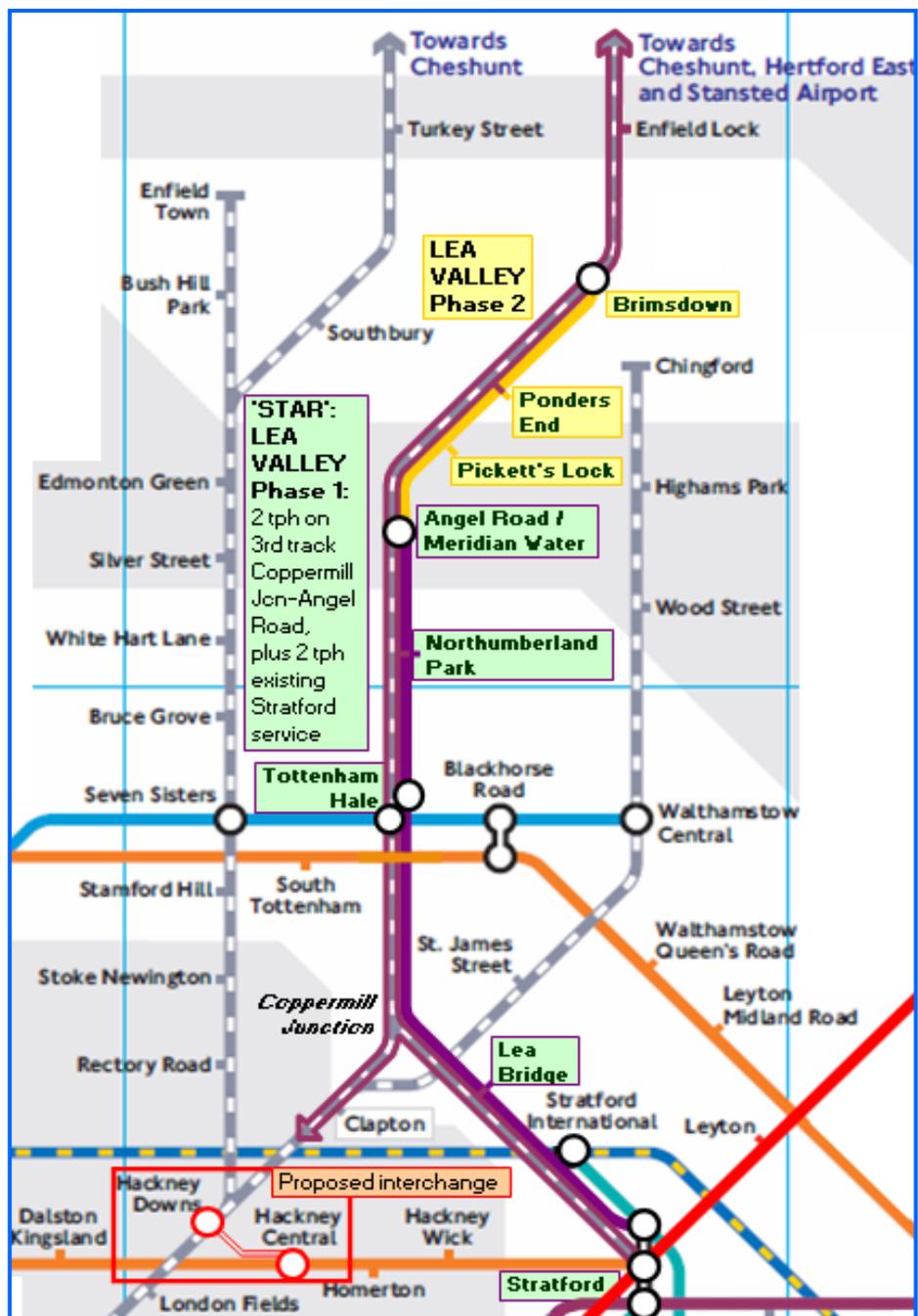
Options will include:

- If there is no quick win for a direct service to Stratford, will other schemes help for the next decade, eg build Hackney Interchange which will assist travel from the Chingford Line and Enfield Line to the Overground, including Stratford *and* other locations?
- Comparable value of implementing Chingford-Stratford *and/or* another 2 tph into Liverpool Street if a few paths are released in 2019 post-Crossrail for West Anglia trains? (The bulk of released paths will be for the Great Eastern, based on the LSE RUS analysis.)
- Is 8-tracking into Liverpool Street likely to be a realistic 2020s project, vs approval, powers and funding of Crossrail 2 - and where might that go if it turns out to be a main line option? Could it have a Chingford branch for short-distance services? Might this hinder or help, or have no impact on the case for Chingford-Stratford?
- When might Crossrail 2 get go-ahead? So far, an early phase (eg Hackney-Clapham) might open by 2033 via Euston to relieve HS2 Phase 2. What is the comparative timing of such a major project vs the shorter term capacity pressures and economic development supported by Chingford-Stratford?

To summarise, in a capacity constrained network, there will always be a judgement about the right intervention matching the scale of benefits with the scale of costs – and the timescales to achieve the results.

The growth expectations set out by London planning authorities, and the starting point of the Chingford Line with its capacity-constrained December 2011 timetable, mean that within the planning period for CP6 there should be:

- Evidence about the forecast future state of train crowding on the Chingford Line
- Business planning by the new long term train operating franchise company, about how it plans to address the PIXC situation
- Identification of any significant gap, alongside the post-Olympics scenario for local economic development
- prioritisation of options for capacity and service solutions, including the role of Chingford-Stratford.



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