Upper Lee Valley Conditional Outputs Statement

March 2012


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FOREWORD

The Upper Lee Valley has the potential to be one of London's top places to live, work and visit, creating a new centre and locus not only for London, but for the Cambridge growth corridor and the UK as a whole.

The Lee Valley is one of London's forgotten gems. Home to over 3000 hectares of waterways, parklands and reservoirs, the valley provides the second largest industrial corridor in London, a key location for many household names such as Warburtons, IKEA, Tesco, John Lewis and Coca Cola.

However the overall decline in UK manufacturing has taken its toll on the area, and the prosperity of the surrounding communities, with high levels of deprivation and unemployment, something that came to the fore in this area which sat at the heart of the disturbances in August 2011.

The Lee Valley Authorities (both within and outside London) are working in partnership to address these needs and to deliver an economic and social transformation of the Valley. The partners will deliver over 15,700 new homes and 21,900 jobs in the Lee Valley itself and up to 15,000 jobs in adjoining areas, creating an uplift to the UK economy of over £4.51 billion by 2021 and over £10.7 billion by 2031, an unrivalled benefit to the Country (*Oxford Economics 2012*).

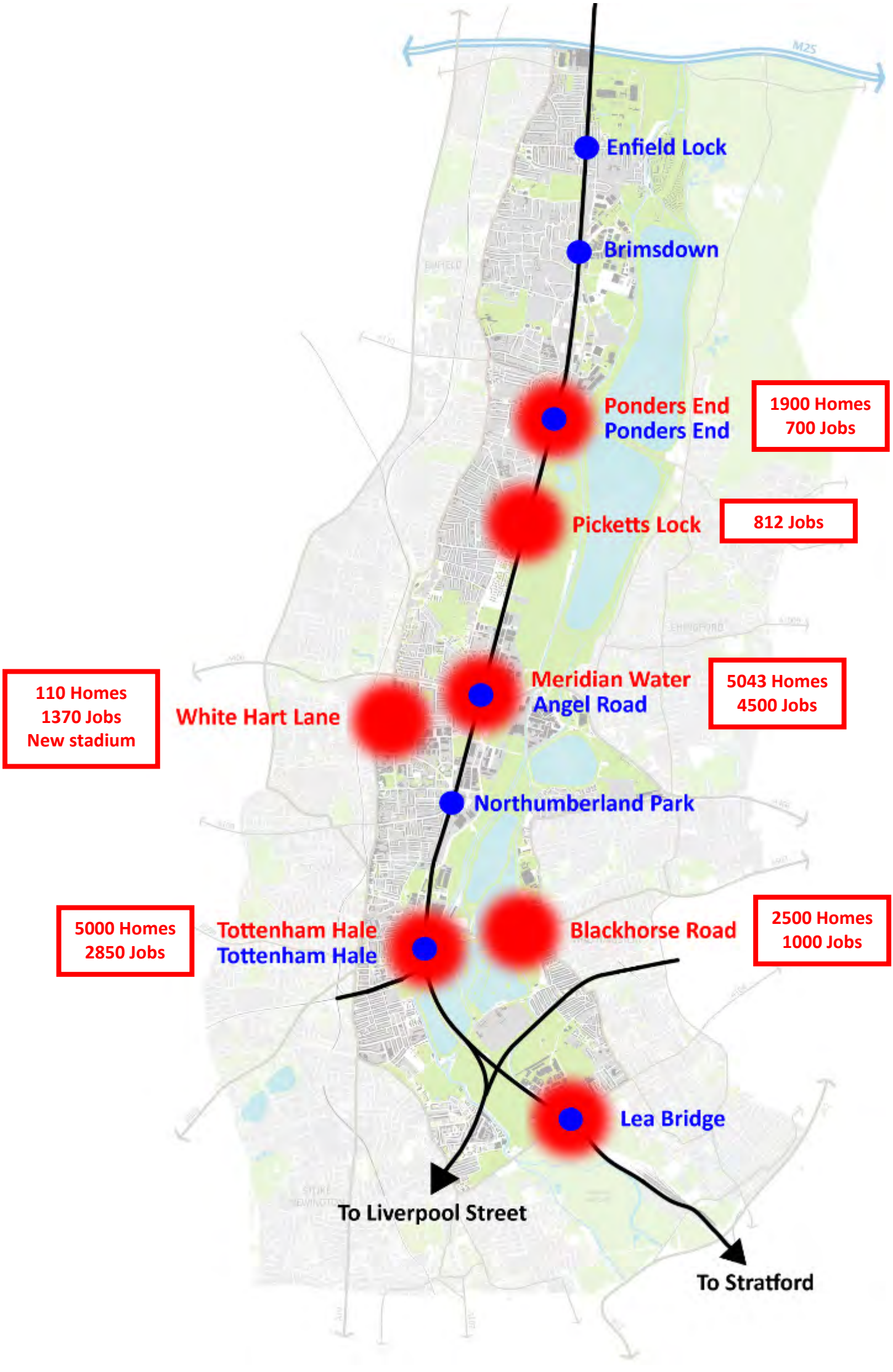
Key to delivering that transformation is the creation of a reliable, resilient and flexible rail service that acts as the backbone to the area around which this development and regeneration can take place.

Network Rail acknowledges that overcrowding and poor performance are key issues on this line, identifying the need to "respond to the capacity, connectivity and other strategic gaps in this corridor". The Strategy set out a number of potential options to deliver these improvements.

In developing the London and South East Route Utilisation Strategy, Network Rail worked closely with the Lee Valley Authorities and Transport for London to test these proposals and identify a way forward to deliver the regeneration of this key area of the London and UK economy.

This Conditional Output document takes forward the work of partners and Network Rail to recommend a number of key outputs to be achieved within CP5 and beyond.

These outputs will act as the critical means to deliver the transformation of the Valley, unlocking key development sites such as Meridian Water by providing 4 trains an hour to stations like Angel Road and Lea Bridge, massively improving passenger experience and quality of service across the Valley.


M25
Enfield Lock
Brimsdown
Ponders End
Ponders End
1900 Homes
700 Jobs
Picketts Lock
812 Jobs
110 Homes
1370 Jobs
New stadium
White Hart Lane
Meridian Water
Angel Road
5043 Homes
4500 Jobs
Northumberland Park
5000 Homes
2850 Jobs
Tottenham Hale
Tottenham Hale
Blackhorse Road
2500 Homes
1000 Jobs
Lea Bridge
To Liverpool Street
To Stratford

SUMMARY

The regeneration of the Upper Lee Valley presents an opportunity to transform the economy of both North London and the UK, delivering significant amounts of new housing and jobs, focused on the industrial and housing corridor along the line of the West Anglia Main Line route.

This statement sets out a proposed series of conditional outputs for improved Lee Valley train services, which the partners want to be referenced in the Department for Transport's forthcoming High Level Output Specification (HLOS2) in June/July 2012. These outputs unlock the potential of this area and transform the passenger experience.

The outputs have been developed in partnership with all of the Lee Valley Local Authorities, Transport for London, Greater Anglia Ltd, the Mayor of London and other regional and national stakeholders. They are a building block for Network Rail's ambitions for investment and improvement of this line set out in Chapter 7 of the 2011 London & South East Route Utilisation Strategy (RUS).

Our outputs are a statement of improvements to Lee Valley services that provide strong benefit to passengers, economic growth strategies and investors along the line from Stratford.

The outputs are described as "conditional". Their realisation depends on the delivery of solutions that are both affordable and provide value for money, especially in light of the recent McNulty review findings. We set out options for delivering this transformation, which the partners want to explore in more detail to ensure their value from operational, financial, economic and regenerative perspectives.

The Upper Lee Valley presents an unrivalled opportunity to transform not only North London, but the UK economy

Currently:

- The Upper Lee Valley opportunity area shows significant economic under-performance, but offers excellent potential for future business growth, with the right support and infrastructure investment.
- At present, local labour markets are some of the poorest performing in the UK, and there are pockets of severe national-scale deprivation.
- Employment growth has been weak – just 3% over the whole decade of UK growth from 1998
- Productivity has stagnated since 2000 while the rest of London accelerated away.
- There is an upside. According to detailed reviews of future potential (*Oxford Economics (2012) – Investment and Regeneration in the Lee Valley*), with a better economic performance the Upper Lee Valley could become one of the brightest prospects for future growth, leading the UK recovery.
- An additional £4.4 billion of GVA could be generated for the UK economy, including £2.1 billion in Enfield alone if the three core Upper Lee Valley boroughs (Enfield, Haringey and Waltham Forest) matched employment and productivity rates in wider London,

The potential economic impacts of the projects are very significant for both the London and UK economies

- The suite of investment projects will create around 21,900 direct jobs in the Upper Lee Valley opportunity area and 18,000 new homes. An additional 15,000 will also be created in neighbouring districts of the Lee Valley Corridor outside London by releasing key strategic sites.
- Economic modelling shows that the projects could deliver cumulative additional GVA of £10.7 billion (at net present value) within the core opportunity area by 2031. Across the whole Lee Valley Corridor, an additional £2.7 billion of GVA per year can be supported by 2031.

While Network Rails immediate solutions offer a way forward on peak time capacity, this doesn't address the need for specific improvements to the line in order to underpin the growth reflected in the Route Utilisation Strategy (RUS)

- The London and South East Route Utilisation Strategy (RUS) notes the basis of a strong business case for this investment to facilitate growth and development and to address passenger need.
- The RUS identifies capacity as a major issue on the line, not only in order to handle the existing predicted growth, but particularly as regeneration proposals in Meridian Water, Ponders End and other key sites as they come forward in CP5, CP6 and beyond.
- The RUS recommends the implementation of a four train an hour service through the Lee Valley to Stratford within CP5 based on infrastructure investment.

None of this can be delivered without investment in the West Anglia Main Line to create a robust, regular, resilient and reliable service

- There are strong, long established links between transport connectivity and economic development.
- Investment in regeneration can enjoy significant additional returns if strong connectivity is in place, as the area becomes more viable as a place to work, live, visit and invest in, the key findings of the recent report by Steer Davies Gleave on behalf of Network Rail.
- Many of the proposed developments in the Lee Valley Corridor and particularly the proposals in Meridian Water need to be underpinned by rail improvements, and the benefits of these improvements need to be explored in investment decision-making.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OUTPUT OVERVIEW

The need for investment in the West Anglia Main Line to create a "turn up and go" 4 train an hour service in order to unlock the massive regeneration potential in the Lee Valley is clear. The partners recognise the difficulties faced by Network Rail and the Department for Transport both in terms of funding major new schemes post McNulty review and in terms of being able to deliver major infrastructure investment without harming existing service provision of key routes such as the Stansted Express.

The partners and stakeholders who will be responsible for delivering this economic regeneration and transformation are therefore proposing the following 6 Conditional Outputs that can be realised in the Lee Valley derived from Network Rails original work in the London & South East RUS.

This document explores these Outputs in more detail, shows the motives and logical approach behind each Output, and then suggests ways forward.

The partners have looked to ensure that the requests are realistic, viable, deliverable and cost effective. We have sought to minimise the requirements for additional investment wherever possible, while ensuring the required improvements meet the existing needs of the route.

The objective of the outputs is to build the foundations for improvements that can facilitate and enable future growth and development, unlocking the massive potential for investment and regeneration in the Lee Valley.

Output 1: Provide a core four trains per hour (4tph) service at local stations in the Upper Lee Valley (including Angel Road)

Output 2: Provide a 4tph service from the Upper Lee Valley and Tottenham Hale to Stratford

Output 3: Reopen Lea Bridge station with a 4tph service

Output 4: Remove Northumberland Park level crossing and provide alternative facilities for cyclists and pedestrians

Output 5: Address timetable shortcomings (resilience / stopping patterns / improved journey times)

Output 6: Provide an improved passenger experience

Through agreement between the partners, the scope of the outputs have been limited to deliverable schemes within Control Period 5 (2014-2019), and limited in physical scope to the section of line between Stratford, Tottenham and Angel Road (STAR), the critical first stage of the infrastructure investment that will begin to unlock growth elsewhere, and can be expanded in future Control Periods as further investment and regeneration comes forward.

Core to these outputs is a “turn up and go” STAR service, with a quality clock face service required by 2016 when the major phase of development across the Lee Valley will be underway, giving regular services, massively increasing connectivity between stations and enhancing links to Stratford and the Olympic legacy sites / transport interchange.

Beyond purely a series of outputs, the stakeholders have examined what the potential STAR service might look like, and this document sets out some initial thoughts and broad costings on the potential STAR services.

Broadly, the cost for the STAR investment lies between C2a (circa £35 million) and C2b (circa £247 million), towards the lower end of that scale. Provisional estimates would be in the region of £72 to £81 million for outputs that deliver the required interventions at Angel Road Station, the core of the Meridian Water development.

The STAR service could take a number of forms focused on a local shuttle service between Stratford, Tottenham Hale and Angel Road on a third track north of Coppermill that overlay 2 trains per hour or more over and above the existing 2 trains per hour service (particularly at Angel Road where this is only a Peak Hours service)

Stakeholders acknowledge the difficulties faced in delivering investment in the current climate, but initial work shows investment in the STAR service not only delivers the aspirations of the partners, but also of Network Rail and other passenger organisations, in a cost effective, viable and deliverable way, and are keen to work with all parties to secure this critically important link.

PASSENGER DEMAND

Extensive station passenger counts have been undertaken during Autumn 2010 and 2011 on behalf of the West Anglia Routes Group and LB Enfield in order to understand the discrepancies between the ORR data and the real experience of passengers on the line.

Surveys were undertaken at all of the major local stations on the Lee Valley line. Part-day counts have been grossed to annual estimates and contrasted with ORR's official data. TfL have then moderated the survey and grossing methodology to ensure reliability and data checking.

The conclusion is that ORR data considerably underestimates the actual passenger footfall for entries and exits by anywhere between 59% to 207%, a dramatic difference between the assumed numbers and the actual numbers of passengers.

The ORR data is nearly two years' out of date, excludes Oyster Pay-as-you-go for most of the year, is based on ticket sales and travel diaries not actual passenger footfall, and based on LATS modelling from 2001.

The new counts have a dramatic impact on the passenger usage numbers in the Lee Valley, massively changing the underlying case for the investment and development in this line. For example, the revised usage at Tottenham Hale places it within the 50 busiest national rail stations in Britain, for entry and exit footfall.

Where the London and South East RUS already estimates substantial overcrowding and strain on this line, the new more accurate data helps to show the reality of the situation, in that the line is significantly more crowded and strained than previous estimations, something played out on a daily basis for passengers on this line.

Following the WARG Passenger Counts, ORR has now acknowledged that its London data is unreliable [1].

A comparison between WARG/Enfield and ORR counts is set out below for the local Lee Valley line stations, and is the data set around which the assumptions in this document have been taken forward.

National Rail Stations	**annual entry/exit**	**annual entry/exit**	**Multiplier to raise ORR volume to estimated actual usage**
	ORR 2009-10	**WARG / Enfield Autumn 2011**	*At Stratford, ORR number is notional based on West Anglia % of National Rail trains*
Stratford LV	*802,127*	**1,462,200**	**+82%**
Tottenham Hale	3,599,516	**6,857,143**	**+91%**
Northumberland Park	160,048	**254,629**	**+59%**
Angel Road	26,960	**42,780**	**+59%**
Ponders End	239,464	**734,190**	**+207%**
Brimsdown	453,426	**1,095,238**	**+142%**
Enfield Lock	754,292	**1,635,714**	**+117%**
Total entry/exit	**6,035,833**	**12,081,894**	**+100%**

[1] Meeting with ORR, 20 March 2012.

DETAILED OUTPUTS

As noted, the partners have identified 6 critical conditional outputs that Network Rail, in collaboration with industry colleagues, would be able to work with the stakeholders and Lee Valley Authorities to deliver within Control Period 5 in order to begin to unlock the significant investment and regeneration potential of the Upper Lee Valley corridor.

Output 1: Provide a core four trains per hour (4tph) service at local stations in the Upper Lee Valley (including Angel Road) linked to major development schemes

The London and South East RUS reviewed three options to deliver Output 1. As the needs case and background research is covered in extensive detail in the RUS, particularly in Chapter 7 of the report, details are not repeated here.

Annex 3 provides a summary of the presented options and the subsequent findings that have come from additional research and examination by the partners and Network Rail.

In summary, the March 2011 headlines based on Network Rail's analyses are:

- Option C2a: provides limited new infrastructure (£25-35m), with service benefits in latest analysis that do not approach the 4tph outputs wanted for Lee Valley growth plans.
- Option C2b: 4tph outputs not delivered fully (uneven service intervals), but the primary Network Rail concern is affordability (£232-247m) within the funds foreseen for 2014-19
- Option C3: costs more than C2b, with most gains within C2b, so is less affordable.

Stakeholders believe there is a more affordable delivery option, between C2a and C2b, which would allow 4tph to be offered as far as Angel Road station and appears to be operationally feasible with well-spaced intervals. This service would connect Stratford, Tottenham Hale and Angel Road (STAR) with a regular operating service to provide significant improvements to rail provision in the Lee Valley, along with securing a more reliable, robust and viable service along the remainder of the line. This STAR scheme is identified and outlined in more detail in Annex 3.

The principles behind a 4tph output requirement are now set out:

- The *'Upper Lee Valley Opportunity Area Planning Framework'* (GLA, Nov.2011) has been prepared by the Greater London Authority in partnership with a wide variety of stakeholder, from local community groups through to Governmental departments.
- It provides a vision for reshaping the Upper Lee Valley over the next 30 years, beginning in 2014, and covers the catchment between Lee Bridge, Tottenham Hale and the M25.
- Transforming the entire local rail service is a key component, to stimulate developers to invest and to persuade people and businesses to come - it is the economic umbilical and the gateway for accessibility.
- A strong transport offer, early, is therefore fundamental [2] .

[2] Para 3.7 of the ULV OAPF says "…a phased project of 3/4 tracking the West Anglia Main Line by 2021 would deliver significant benefits – improving the frequency of existing journeys into Tottenham Hale and better connections of the growth areas of the Upper Lee Valley with Stratford, as one of the primary aims of this planning framework. The project improves transport choice, [and] particularly at Angel Road will greatly benefit development at Central Leeside."

- Meridian Water is the planned new sub-regional urban centre, one of the largest regeneration schemes in the UK with the potential to deliver over 5000 new homes and 3000 new jobs, with preparatory works and investment already underway and major development schemes outlined to commence in 2014.
- It is currently served weakly by Angel Road Station, with limited 1 or 2 tph peak-only trains and extremely poor accessibility, despite being located next to existing major centres of employment and travel such as IKEA, sub regional shopping and Coca Cola's main UK bottling plant. The station has a significant existing potential catchment that is under utilised and the potential for a step change in usage as work commences to deliver Meridian Water.
- Northumberland Park, between Angel Road and Tottenham Hale, is also weakly served with only 2 tph on weekdays; it will be part of the Tottenham Stadium redevelopment catchment from 2013 and is a secondary catchment for Meridian Water, with the potential for a significant uplift in usage.
- A number of the Lee Valley wards have the worst deprivation of the whole of London, with 29% unemployment; the Upper Lee Valley also adjoins and includes the Tottenham and Enfield riot zones of August 2011, with a lack of connection to employment cited by Government as one of the catalytic factors in stimulating unrest.
- Brimsdown and Ponders End are also primarily 2tph on weekdays, though they have more AM peak trains towards Central London and Stratford. The fragility of the existing service often means that services are cancelled or significantly (15+ minutes) delayed at peak hours, despite a significant catchments for both commuters in to Central London, and those coming to the nearby industrial business parks.
- Enfield Lock has a minimum 3 tph service off-peak, with 4tph in peaks.

The identified solution along this corridor is a fundamental change in rail services, quickly, benefiting stations in the Lee Valley. This is seen by all agencies and stakeholders as the only way to drive lasting investment with results on a sufficient scale to transform the valley and unlock its potential for growth.

The quality of outputs achieved by rail investment during Control Period 5 is vital to create a strong start and the right trajectory for the area's transformation.

The January 2012 economic analysis by Oxford Economics *'Investment and Regeneration in the Lee Valley Corridor'* identifies a **"cumulative additional GVA of £10.7 billion (at net present value) within the core opportunity area by 2031"**, with 21,900 direct jobs created and 18,000 new homes.

In para 5.2 the report notes that as part of their modelling "enhancements to the rail service provided along the West Anglia Main Line will be a key component of regenerating the Upper Lee Valley economy", with the linkages between key regeneration sites and the railway clearly identified. "It is important to acknowledge that regeneration and business investment, as well as people making the decision to live in a particular location, is often contingent on the quality of transport links to and from the area".

It shows potential growth of UK GVA of **£552.6 million per annum by 2016** and **£953.1 million each year by 2021**, a cumulative additional UK GVA growth across the CP5 development impact window of approximately £4.51 billion (at net present

value) in the Boroughs of Enfield, Haringey and Waltham Forest. Much of this can be attributed to the development of improved rail services in the Lee Valley.

So the underlying requirement is a trusted, reliable, clock-face interval service which achieves a 'turn-up-and-go' standard for the Lee Valley's existing and new developments, and which can convince developers to commit to area investment and potential new home owners to commit their lifestyle to the railway, in more directions of travel than just Central London.

This also requires investment and operational commitment to rail quality, covered in **Output 5** and new **Output 6**.

A table is attached below which gives a high level assessment of the foreseen growth in population and jobs in Upper Lee Valley catchments close to local rail stations on the Lee Valley line.

The table is based on individual site forecasts for construction jobs, phased and final occupier numbers, and secondary school populations.

No estimate is made of retail and leisure users of the new facilities, though demand is expected at Angel Road which will serve IKEA, along with demand at Northumberland Park and Picketts Lock / Ponders End to serve the new major leisure opportunities in the Valley.

A more detailed examination of the underlying growth and regeneration of the Lee Valley sites are presented later in this document.

There are clear implications for additional public transport volume for different rail station catchments, with significant growth around a number of hubs and particularly at Angel Road as Meridian Water begins development.

There will be underlying growth at Brimsdown, Ponders End and Northumberland Park, which of course already have existing residential and business park catchments.

Ponders End data excludes the new academy opening in 2013 directly adjacent to the station, whose management team have emphasised their aspiration for a significant portion of their children to use the rail service as part of their school day.

New population, jobs and secondary school numbers during 2013-2025, Upper Lea Valley, in station catchments	New user potential 2013	New user potential 2014	New user potential 2015	New user potential 2016	New user potential 2017	New user potential 2018	New user potential 2019	New user potential 2020	New user potential 2021	New user potential 2022	New user potential 2023	New user potential 2024	New user potential 2025
BRIMSDOWN													
New population, 2.3 people/unit	0	0	0	0	0	0	0	0	0	0	0	0	0
New secondary school pupils	0	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
New jobs	150	0	100	300	400	400	400	400	400	400	400	400	400
PONDERS END (catchments shared with Southbury taken at 50% of total)													
New population, 2.3 people/unit	0	0	0	242	472	644	644	644	644	644	644	644	644
New secondary school pupils	0	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650
New jobs	220	0	40	50	55	35	35	35	35	135	35	35	35
ANGEL ROAD (Meridian Water and Central Leeside)													
New population, 2.3 people/unit	0	0	580	1,159	1,739	1,739	2,456	3,172	3,889	4,284	4,678	5,073	5,467
New secondary school pupils	0	0	0	0	0	0	1,500	1,500	1,500	1,500	1,500	1,500	1,500
New jobs	225	325	1,068	1,611	2,154	3,766	2,849	3,432	3,940	4,057	4,173	4,290	4,407
NORTHUMBERLAND PARK (share of Tottenham Hotspur redevelopment taken as 15% of total)													
New population, 2.3 people/unit	0	32	64	97	97	97	97	97	97	124	152	179	207
New secondary school pupils	0	0	0	0	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200
New jobs	23	91	160	303	206	206	206	206	256	381	506	631	706

The fundamental step change in demand is at Angel Road, which within 2014-19 drives most of the population and jobs growth. As set out above, its development is critically sensitive to a step change in public transport supply by 2015-16, and a visible public commitment to achieve that, which pays dividends in following years.

Overall, the Lee Valley stakeholders reiterate that the real solution to the area's transformation rests with the full Option C2b, preferably improved further, eg with timetabling changes, to ensure a regular 4tph interval service.

This should be underpinned by 'London Overground' quality trains and stations, and marketed and operated in a way that people will respond to with trust and commitment of their investments and their living styles (see **Outputs 5 and 6**).

A **full Option C2b leverages 40-45 times its initial investment over the years to 2031**, in Treasury accounting terms.

Recognising the affordability issue during the next five-year investment period, the most urgent specific outputs are:

1.1 4tph all day all week service at Angel Road and Northumberland Park stations

1.2 Angel Road and Northumberland Park to be not more than 15-20 minutes train journey from Stratford, and not more than 5 minutes from Tottenham Hale

1.3 4tph to be achieved by 2016 when early developments open at Angel Road.

It is understood that the delivery of this output may be a mixture of existing train services and a supplementary local train service using a partial third track, possibly with other changes to stopping patterns on the Lee Valley main line. This investment would deliver the STAR objectives outlined above. An outline specification is suggested in **Annex 2** and we would look to work closely with Network Rail to support an exploration of this option in more detail in order to undertake a full detailed assessment and potential business case.

Short term improvements to services at **Brimsdown and Ponders End** are discussed in **Output 5**.

Pickett's Lock is not foreseen as requiring a station until the 2020s. All that is needed here is for protective passive provision to be adopted in any shorter term changes.

Funding Output 1

Output 1 capital funding is requested from HLOS2. Stakeholders are prepared to address how any shortfall in operational revenue and capital interest charges should be covered for early years' service, with discussions already taking place to understand how partners may assist in funding and delivering these schemes led by Network Rail / DfT.

The requirement is similar to the initial years of the DLR Beckton service which was specifically opened early on and successfully stimulated transformation of the Royals.


17:17 Plat 11
Hertford East
Calling at: Page 1 of 2
Tottenham Hale
Northumberland P
Angel Road
Enfield Lock
Waltham Cross
Cheshunt
Broxbourne
Rye House
St Margarets
Greater Anglia
17:15:10

Output 2: Provide a 4tph service from the Upper Lee Valley through Tottenham Hale to Stratford

The London and South East RUS identified that an output to improve West Anglia services into Liverpool Street, above 22tph, was not feasible due to the heavy load of services and foreseeable train service commitments. The RUS assessed peak capacity would remain fixed at about 22 trains per hour, via Hackney Downs, because of the availability of only one track each way between Bethnal Green and Liverpool Street.

Network Rail studies show that, when capacity is released at Liverpool Street after Crossrail takes over most Great Eastern inner services, most or all of that capacity would be better used by Great Eastern because of the greater crowding on the GE lines.

There is also the growth of major spatial developments in the Stratford area, such as Stratford City, the Westfield Complex and post-Olympics legacy investment, and the attractions of Stratford as a major regional interchange for London and beyond, with Crossrail arriving by 2018.

Hence providing additional trains to Stratford is a fundamental output for all future scenarios for Lee Valley transport and development planning, until Crossrail 2 presents itself in the late 2020s or 2030s.

Output 2 is the **only** available option to provide additional capacity and connectivity between the Lee Valley line and major origins and destinations in East and Central London and the only way of delivering the transformational growth envisaged by all parties in the Lee Valley and beyond.

The critical interchanges are **Stratford**, with its multi-way access, and at **Tottenham Hale** with the Victoria Line and Liverpool Street services, and also there for West Anglia passengers to be able to catch Stratford services. Some other journeys might benefit with a direct interchange between **Hackney Downs and Hackney Central**.

To be successful, the development scenarios also require improved interchanges at Tottenham Hale, Stratford and Hackney Downs, to offset the inconvenience of enforced interchange from the Lee Valley route. Better transfer arrangements (physically and with signage and real time information) are required at:

- **Tottenham Hale (more interchange capacity, step-free access, gating and barriers)**
- **Stratford (primarily improved signage and information for the rebuilt station)**
- **Hackney Downs (new direct behind-the-barriers interchange between Hackney Downs and Hackney Central stations, to open up quick access from the Lee Valley route – and Chingford line – to London Overground).**

Station counts by the West Anglia Routes Group show that localised flows between Stratford and Tottenham Hale represent 25-50% of all train loadings between those interchanges. This is an orbital travel movement which would benefit from a higher frequency service at 4tph specification, using the London Overground criterion.

Output 2 is therefore can be outlined as forming two separate but interlinked components:

2.1 Provide an all day 4tph service through to Tottenham Hale and Stratford from local Lee Valley line stations

2.2 Provide improved interchanges at Tottenham Hale, Stratford and Hackney Downs/Hackney Central.

These outputs will deliver the step change in passenger experience in the Lee Valley that is required both to unlock growth and to deliver the levels of service provision and interchange expected from this commuter link.

Funding Output 2

Output 2 capital funding is requested from HLOS2. Because it is foreseen as integral with Output 1, the same expression of stakeholder support applies, to cover any shortfall in operational revenue and capital interest charges.

Stakeholders are pursuing funding options for securing Hackney Interchange within the CP4 timescale.

The delivery of this 4tph service is critical to the investment and regeneration of the Lee Valley, and as such the partner Authorities and agencies would be supportive of looking at new and innovative funding mechanisms, and identifying where they may be able to provide direct and indirect financial support to deliver these rail improvements.

Output 3: Reopen Lea Bridge station with a 4tph service

The proposal by the London Borough of Waltham Forest to secure reopening of Lea Bridge station, using S106 funding, conforms to the orbital initiative to improve the Stratford-Tottenham Hale service (**Output 2**).

Output 3 is independent of HLOS2, as the scheme to reopen Lea Bridge station is currently proceeding within its own deadlines linked to Westfield funding. Nevertheless the station will add significantly to Upper Lee Valley connectivity and to area regeneration when it is opened, potentially by 2014, in turn strengthening the business case for other outputs.

Lea Bridge would be about 5 minutes rail journey time from both Stratford and Tottenham Hale interchanges, which represents a strong service offer. For travel to Central London, the ability to route either way via Stratford or Tottenham Hale interchanges would offer up to 8tph, so would be a walk-on frequency.

Current road and public transport journey times from the Lea Bridge Road catchment to nearby major centres (eg Stratford) can exceed 30 minutes and so the rail service will be highly attractive to potential users.

It underpins the economic regeneration of the northern zone within the Olympic Games/Lower Lee Valley area and the southern fringe of the ULV Opportunity Area Planning Framework.

Development of scheme costings, demand and a business case are being taken forward urgently in view of the Section 106 deadline for project sign-off, which must be by the end of December 2012. Headlines from the current assessments are:

- Capital cost of scheme (based on TTPP consultancy assessment): £4.8m-£5.4m.
- Station footfall tested by TfL using Railplan:
    - 2tph, London Plan growth to 2031: 352,000 entry and exit annually
    - 4tph, London Plan growth to 2031: 1,192,000 entry and exit annually
    - 4tph, additional LBWF growth: 1,326,000 entry and exit annually.
    - There is a strong differential between 2tph and a turn-up-and-go 4tph.
    - **Clearly a 4tph service is important here to make the station an attractive option for passengers in the local area. This has implications for choosing service options elsewhere in the Lee Valley, between 2tph and 4tph.**
- A business case is not yet finalised, but as an extreme test, a station capital cost of £45m (nearly 10 times the expected cost) points to a high 2:1 BCR.

The station catchment has Super Output Areas with nationally high levels of deprivation with difficult access to local employment. Transforming the catchment's accessibility is a fundamental role for this station. It is the only potential rail access for a large part of the catchment.

Funding Output 3

Westfield provided a £4m Section 106 grant, as part of the planning approval for Stratford City development. Conditions were that the funding should be applied to a direct Chingford-Stratford rail service and/or towards reopening Lea Bridge station by the end of 2012. The pot has grown with interest applied, and is now worth approximately £5m.

Output 4: Remove Northumberland Park level crossing and provide alternative facilities for cyclists and pedestrians

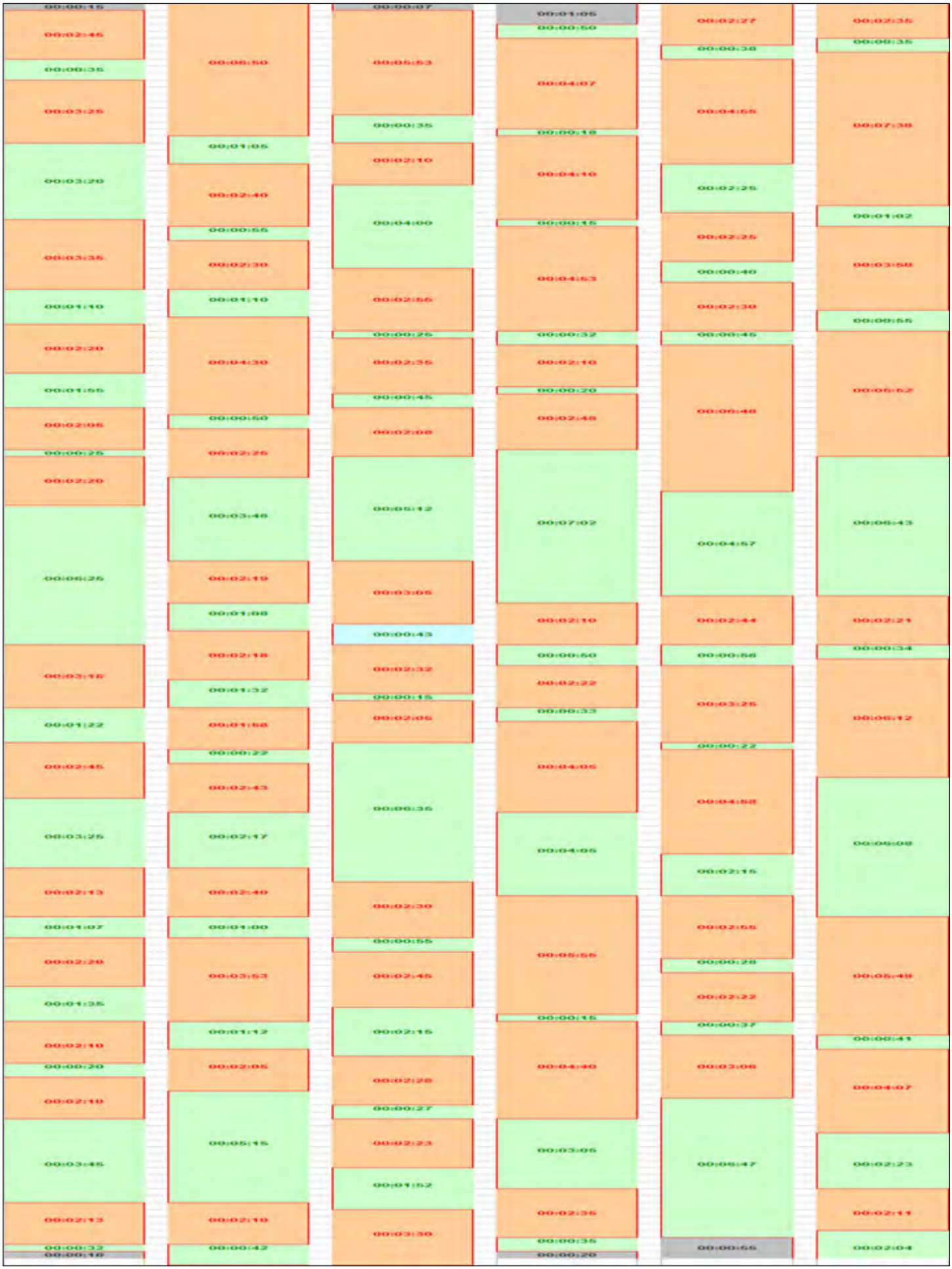
The Lee Valley main line creates a severance effect on neighbourhoods and businesses, while the road crossings hinder rail performance. There are no easy options to replace road crossings at Brimsdown and Enfield Lock stations, and this remains a long term aspiration linked to more extensive 3 / 4 tracking. There may be scope to improve local pedestrian and cycle crossings, and work is underway with stakeholders to assess the potential options in this area.

At Northumberland Park, there is already considerable severance caused by the rail service frequency. A survey of PM (Thursday 3rd November 2011) and evening peak (Tuesday 8th November 2011) level crossing opening and closure periods, to the nearest second/5 seconds, was carried out for the West Anglia Routes Group and is set out below, analytically and visually.

In the accompanying visualisation on the following page, green are periods open to road traffic, red are periods from start of barrier closure to its full reopening for traffic, after trains have passed. Each column shows a period of 60 minutes. 'Traffic-open' periods can be as short as 20 seconds, and there are both rail safety and rail performance risks because of the temptation for drivers to dash across as barriers are closing, which have been witnessed on a number of occasions in this area.

The summary of 6 hours' survey is that already, peak or off peak, there are only 3-4 occasions an hour when the crossing is open to traffic for more than 2 minutes at a time. In the off-peak the crossing opens 12-13 times an hour, but is actually shut for over 36 minutes every hour. In the PM peak the crossing is open less often, 10-11 times an hour, but often for short periods only. Indeed in the PM peak it is open for more than one minute at a time on an average of only four occasions an hour. It is closed for nearly 40 minutes an hour.

Northumberland Park Station, level crossing opening/closure periods					
3 hours offpeak 13:40:15 to 16:41:05 (Thu 3/11/2012)	Occasions	Total duration	Average period	Average in one hour	
	No.	Hr:min:sec	Min:sec	No.	Duration
Barriers open to traffic	38	1:11:11	01:52	12.7	23:44
Barriers closed to traffic	39	1:49:39	02:49	13.0	36:33
(incl warning period and 5 secs after start of opening)					
Barriers open more than 1 minute at a time	23	1:02:25	02:43	7.7	20:48
Barriers open more than 2 minutes at a time	11	0:46:17	04:12	3.7	15:26
3 hours PM peak 16:41:05 to 19:40:45 (Tue 8/11/2012)					
Barriers open to traffic	32	1:00:35	01:54	10.7	20:12
Barriers closed to traffic	31	1:59:05	03:50	10.3	39:42
(incl warning period and 5 secs after start of opening)					
Barriers open more than 1 minute at a time	12	0:48:56	04:05	4.0	16:19
Barriers open more than 2 minutes at a time	10	0:45:50	04:35	3.3	15:17



Northumberland Park crossing 13:40-19:40. Column = 1 hour. Barriers open to traffic (green), closed (red)

The survey was undertaken before the December 2011 timetable, so excludes the impact of additional Liverpool Street-Broxbourne contra-flow empty train moves and Liverpool Street-Cambridge expresses which now run in the peak periods.

The super-imposition of an additional 2-3 trains per hour in each direction (depending on the frequency of the supplementary local service), is likely not only to increase the frequency but also the duration of closures. It could be worse with extra local trains routed on the main line rather than a third track, as they would have to fit between the existing trains so could take up more of the remaining 'long green' slots.

It is essential that this crossing is closed to road traffic and a satisfactory alternative provided by 2015, as part of the objective to achieve an increase in local Lee Valley rail services at least as far as Angel Road station.

Direct replacement of the pedestrian and cycle crossing at this location with good quality facilities is required, and this is a low-cost element which will be of general benefit to the potential for development and connectivity in the Upper Lee Valley.

Traffic modelling shows there is no need for a direct vehicle traffic replacement, as there are road bridges less than 700 yards north (Leeside Road in Meridian Water), and less than 1100 yards south (Watermead Way, part of the North-South Route).

Transport for London's (TfL's) plans to rebuild the Tottenham Hale gyratory and relieve local traffic flows there will provide a solution for many of the crossing movements, as traffic will no longer have to head as far south as Seven Sisters in order to head west or north-west.

TfL starts work on this scheme in the financial year 2012-13, which is due to be completed by 2014.

Funding Output 4

TfL has already budgeted to award the Tottenham gyratory contract in June 2012 with construction starting in November 2012. Replacement crossing facilities for pedestrians and cyclists at Northumberland Park are expected to be funded from the HLOS2 Level Crossings funding.

Output 5: Address timetable shortcomings (resilience / stopping patterns / improved journey times)

In order to address the current and future issues with the West Anglia timetables and the shortcomings that are causing significant issues with operations on the line and have the potential to limit future reliability and usability, the partners are suggesting three key components of this output.

Resilience:

With the new December 2011 West Anglia timetable, additional trains were inserted into the Lee Valley schedule, with empty stock workings in the AM and PM contra-peak direction, for the new Broxbourne-Liverpool Street semi-fast peak trains (2tph). In the AM and PM peaks, there are also additional, express Cambridge trains.

Apart from the capacity limitations these have caused for additional local services under the Option C2a format, they have increased performance risks and the ability of the West Anglia services to recover from operational hiccups.

An example of this service fragility was the first day of services running under Greater Anglia's new franchise where services were delayed for over 20 minutes and cancelled due to the inflexibility of the inherited timetabling and service provision.

Therefore the required output is:

5.1 a trusted, reliable, clock-face interval service convincing developers to commit to area investment and potential new home owners to commit their lifestyle to the railway (see **Output 1**).

Provision of ***partial*** three-tracking may be a solution to consider here, as far as Angel Road, because affordability is expected to rule out Option C2b as far as Brimsdown. Freeing up some local train stopping patterns from the constraints faced on the main line tracks can provide a level of service assurance for a local shuttle segregated north of Coppermill Junction.

Effectively the annual interest charges associated with partial three tracking are the real additional capital costs of this scheme, and these will be small in relation to the annual GVA gain achieved by an assured 'turn-up-and-go' service, even midway during Control Period 5.

As noted already, stakeholders are prepared to address how any operational revenue and capital interest charges should be covered for early years' service.

Stopping patterns:

A new local shuttle service (on a third track or main line) would allow new thoughts about the existing stopping patterns on the main line. This would create the flexibility and adaptability within the network to look at options for service provision and adaptability to changing passenger need over the Control Period and beyond.

As noted, as part of the consideration of new stopping patterns, it is clear that the provision of reliable "turn up and go" services will be essential in delivering transformational regeneration in the Lee Valley, particularly at Angel Road station at the heart of Meridian Water, and at Northumberland Park linked to the redevelopment of the White Hart Lane stadium.

Therefore the required output is:

5.2 a 4tph all day service at Angel Road and Northumberland Park.

We are keen to review possible delivery options with Network Rail, including the option (as suggested above and in **Annex 2**) for a third track to Angel Road in the short term.

Off peak, there is currently no service at Angel Road, and only 2tph at Northumberland Park, compared to the specified 'turn-up-and-go' clock-face 4tph. This is unacceptable to all parties where major regeneration schemes are being delivered in and around these stations, with the potential for significant passenger flows and investment which would be curtailed or stalled completely by a lack of future investment.

For **Brimsdown** and **Ponders End** stations, there are already additional selected stops southbound in the AM peak, to Tottenham Hale and Liverpool Street or Stratford. There is no PM peak return uplift in frequency, which will be particularly relevant for future regeneration and development schemes.

Therefore in order to see improvements throughout the Valley corridor, partners would seek a further output of:

5.3 North from Tottenham Hale, achieving the desired 4tph output in the PM peak.

There is only a 2tph off-peak service. These current limitations also require timetabling assessment.

Improved journey times:

For longer distance commuter trains, an improved journey time might be achieved by fewer intermediate stops. However options lesser in scale than C2b might not be able to deliver that output because there will be correspondingly greater reliance on the existing main line tracks in order to deliver the local service output.

5.4 Within Greater London, the outputs are to reduce overall journey times through a combination of reduced waiting times, greater service resilience and higher frequency, within a request for 4tph all day services.

5.5 Within this context, the further output is to aim to retain most of the journey time savings achieved with the December 2011 timetable, whilst achieving the outputs required within Greater London.

Funding Output 5

No new capital funding is expected for Output 5. The passenger benefits of greater service resilience and reduced journey times may be expected to balance or outweigh any operational costs arising.

Output 6: Provide an improved passenger experience

Transport for London has specified required outputs for local rail services in London, in its bid and proposals for HLOS2 investment during 2014-19. This was referenced by the Treasury in the 2012/13 budget statement in March 2012. The rationale that these standards should be applied to the Lee Valley local services is set out above in the discussion on **Output 1**.

Some specific elements are highlighted below:

6.1 Better quality rail stations

The stations along the Lee Valley line have suffered from significant underinvestment for a number of years. Long term investment by the franchise operator is not expected until the commencement of the long term franchising agreement post July 2014.

High quality stations that feel safe, approachable and useable are key to improving the quality of passenger experience and in turn increasing passenger usage. The franchise operator, Greater Anglia, has already committed to significant investment in the stations, including deep cleans, improved cleaning and maintenance. This will be taken forward by the future long term franchise operator who will enter in to long term management / leaseholder arrangements.

However, as part of that investment, the partners would seek commitment from Network Rail and DfT for the provision of DDA facilities, operated to London Overground standards including staff during passenger service hours, with the addition of ticket barriers to recover fare revenues, and secure stations accreditation at all stations, with a focus on future major passenger hubs at Angel Road, Ponders End, Tottenham Hale and Lea Bridge Stations.

6.2 High quality service information and effective marketing

In addition to the investment in direct physical infrastructure and improvements, the partners would also seek commitment to providing high quality service information and working in partnership with Local Authorities and the franchise operator to effectively market the services and stations. This will achieve high levels of passenger trust and willingness to use rail as part of lifestyle and help to transform the perceptions of the railway.

6.3 Improved train standards

Refurbished, clean, comfortable vehicles, and on-train passenger information will be an essential part of the improvements to the line, and partners would seek to work with Network Rail and the franchise holder to improve rolling stock and available information to create a reliable and well used service.

6.4 4tph minimum frequency 'walk-on' services at West Anglia's London stations

Whilst improvements to the service provision can be achieved through the delivery of infrastructure investment (particularly the potential STAR scheme), the partners are keen to ensure that the intervals between trains are evened out to the maximum extent possible.

Where a third track is not available for dedicated local services, this 4tph output should be aimed for at local Lee Valley

stations, particularly to/from interchanges such as Tottenham Hale and Stratford to provide the necessary regular services required to deliver the transformational regeneration of the Lee Valley.

6.5 Specific Angel Road investment to match commitments from existing partners

Angel Road has been noted as the "least accessible station in London", with current access via a single entrance from a raised bypass, that takes potential passengers underneath the raised road via a concrete spiral staircase, along a footpath between the main line and the rear of a scrap yard, to the Western platform, with no direct access from the East to the southbound services.

Yet, only a single fence panel stands between the station and significant numbers of potential users.

Angel Road station actually lies at the heart of the Meridian Water redevelopment, already no more than 20 metres from the nearby sub regional Tesco and 100 metres from the IKEA store, along with directly facing Coca Cola's bottling plant and an extensive industrial corridor, with over 500 jobs within 10 minutes walk of the station.

As noted in Steer, Davies Gleave's recent report for Network Rail;

"[there is] strong evidence that station investment can have a major impact in terms of urban regeneration and transformation. In particular, such investment can unlock the development potential within and around the station boundary, increasing investment, employment and incomes." Steer Davies Gleave (2011)[3]

Therefore the London Borough of Enfield, in partnership with a variety of stakeholders including Transport for London and Greater Anglia have committed to long term improvement of the station, with Enfield Council spending over £1.25 million in the 2012/13 financial year to create new station entrances, footpaths and connections to transform the existing connectivity.

However, the Councils ability to transform the station is limited to the investments it can make within its own land holdings and highway areas. Therefore partners are seeking additional investment in CP5 for station infrastructure to permit DDA access and short, direct access to retail stores, industry and housing to help create a new transport interchange and hub at the centre of the Meridian Water development.

Funding Output 6

The improved passenger experience will require funding from HLOS2, current and future franchise commitments, and from possible future Section 106 agreements / CIL payments from developers. Specific grant aid to upgrade local stations is already being bid for by Haringey and Enfield Councils from the Mayor of London's post-riot funding for improvements to localities and Enfield Council have already committed significant funding to improvements to the station already.

[3] *'The Value of Station Investment: research on regenerative impacts report'* November 2011

STAKEHOLDER ENGAGEMENT

Significant improvements to the West Anglia Main Line to deliver a 4 train an hour service, improved rolling stock and other associated infrastructure enhancements have been a key stakeholder aspiration for the partner Authorities, groups and organisations in the Lee Valley and beyond for a number of years.

Focused through the West Anglia Routes Group (WARG), the partner Authorities have been working closely with Network Rail, the Department for Transport, rail operators and Transport for London along with cross party political support to deliver improvements across the route over the last five years.

In response to the Greater Anglia Ltd franchise consultation in April 2010, the partner Authorities and the West Anglia Group looked at the potential options for service improvement through re-timetabling and infrastructure investment. This work yielded a number of significant results, indicating the opportunity for service improvement across the valley was not only viable and deliverable, but cost effective.

Taking those findings forward, the partners worked closely with Network Rail and Transport for London on the drafting and development of the London and South East Route Utilisation Strategy (July 2011) which built on the needs case established by the stakeholders to acknowledge that overcrowding and poor performance are key issues on this line, identifying the need to "respond to the capacity, connectivity and other strategic gaps in this corridor", dedicating Chapter 7 to understanding the potential routes for delivering service improvements on this line.

Following further more detailed work post publication, the key stakeholders and partners, including the Boroughs of Enfield, Haringey and Waltham Forest, Transport for London, representatives of the West Anglia Routes Group and franchise bidders held a series of high level meetings to discuss their aspirations for the route and the key requirements to deliver successful regeneration and revitalisation of the Lee Valley.

The initial high level requirements were developed over a series of discussions and briefings between Autumn 2011 and Spring 2012. In February 2012 the partners began development of these aspirations and requirements in to a series of key high level outputs that could be achieved along the route to deliver the transformation of the Valley.

At this time, Abellio were successful in their bid for the franchise, and the partners commenced discussions with Greater Anglia Ltd in earnest on the future of the Lee Valley services.

This document captures the aspirations of all partners along the route as a series of key high level outputs at a high level, but also both has broadly tested the outputs to ensure they are deliverable, viable and effective (building on the work of the Route Utilisation Strategy and subsequent modelling), and identifies interventions alongside the needs case.

GROWTH IN THE LEE VALLEY

The Upper Lee Valley is one of the key regeneration and development opportunities not only in London, but the UK as a whole. It contains unrivalled existing assets such as the Lee Valley Regional Park, a substantial existing industrial land base and significant regeneration sites which could, with the right investment to unlock connectivity in the valley, providing an amazing catalyst for economic and physical regeneration.

One of the key potential catalysts for change is the opportunity to rationalise land uses around major transport hubs, particularly rail stations and interchanges, around industrial estates and the park. The partner Authorities and stakeholders have worked closely together to understand the potential in the valley and the opportunity for rationalising and sharing uses, to create a shared approach to the regeneration of the Valley. This approach is set out in the Mayor of London's Upper Lee Valley Opportunity Area Planning Framework (OAPF), capturing and bringing together the regeneration plans of the partner Boroughs and Authorities in to a single vision for the transformation of the valley.

The OAPF sets out the major schemes coming forward over the next 20 years within the Lee Valley to deliver. The suite of proposed investment projects could create around 21,900 direct jobs in the Upper Lee Valley opportunity area. An additional 15,000 could be created in neighbouring districts of the Lee Valley Corridor by releasing key strategic sites.

Economic modelling has shown that the projects could deliver cumulative additional GVA of £10.7 billion (at net present value) within the core opportunity area by 2031 and £4.5 billion in net present value by 2021 when interventions undertaken in CP5 will have been completed.

Across the whole Lee Valley Corridor, an additional £2.7 billion of GVA each year could be supported by 2031.

But the economic potential of the projects goes much further than this. If successful, regeneration could transform the area's economy, raising productivity, attracting investment, reducing transport congestion in London, and becoming a viable engine of long-term economic growth for the UK.

The largest of these regeneration schemes is Meridian Water, delivering over 5000 new homes and 3000 new jobs to create an entirely new eco community focused around Angel Road Station, one of the UK's largest regeneration and redevelopment schemes.

The benefits of transport improvements to act as a catalyst for wider economic development and regeneration of the Lee Valley cannot be underestimated. The relationship between transport connectivity and economic development is strong and long-established, and recognised by policymakers. For example, the following quote is taken from a CLG document on regeneration:

"Transport improvements could, in principle, improve economic performance [through] re-organisation or rationalisation of production, distribution and land use; effects on labour market catchment areas and hence on labour costs; increases in output resulting from lower costs of production; stimulation of inward investment; unlocking inaccessible sites for development; and triggering growth which in turn stimulates further growth."[4]

[4] Originally taken from the Standing Advisory Council on Trunk Road Assessment (SACTRA), cited in CLG's report '*Valuing the Benefits of Regeneration*', Economics Paper 7, Volume I (Final Report), p61, December 2010.

Previously, in 2006, Sir Rod Eddington concluded in his review of UK transport policy on behalf of central government, that:

"The performance of the UK's transport networks will be a crucial enabler of sustained productivity and competitiveness… Good transport systems support the productivity of urban areas, supporting deep and productive labour markets, and allowing businesses to reap the benefits of agglomeration… Consequently, transport policies offer some remarkable economic returns with many schemes offering benefits several times their costs…"[5]

and that;

"strategic economic priorities for transport policy should be: congested and growing urban areas and their catchments; together with key interurban corridors and key international gateways that are showing signs of increasing congestion and unreliability." Eddington (2006)

Eddington's research argues that the UK is already well connected and that one of our key challenges is to improve the performance of the existing network to provide transport infrastructure appropriate and effective enough to deliver the aspirations and economic stimulus we require.

This is a view reiterated by subsequent Governments and the Department for Transport in recent years.

This vision of the potential for transport led transformation that summarises the issues faced by the Lee Valley and the route to it's regeneration, through investment in the rail infrastructure of the Valley which in turn will stimulate investment, increase development potential, unblock sites, allow increase connectivity and accessibility and help to deliver new homes and jobs, addressing the critical economic stumbling blocks in the region and delivering growth on a UK wide basis.

Similarly direct research by the Boroughs and their partners (Investment and Regeneration in the Lee Valley – Oxford Economics 2012) shows that the lack of rail investment and regular high quality services, particularly in and around the Meridian Water development is significantly holding back growth.

Taking Meridian Water as an example of the wider impact on the corridor across the Boroughs of Enfield, Haringey, Waltham Forest and neighbouring Authorities, the accompanying table taken from the Oxford Economics report underlines the potential impact a lack of rail investment will have in delivering economic growth.

Annual GVA impact estimates for Meridian Water (£million, 2006 prices)

	2016	**2021**	**2031**	**2051**
Total potential Meridian Water impact	71.1	145.9	369.5	939.7
Potential impact without rail improvements	56.0	114.9	297.1	736.2
Difference	15.1	30.9	72.4	203.5

Broadly assuming the same 22% drop in growth across the valley with a lack of rail investment, this will mean a loss of around £1 billion to the economy by 2021 and close to £2.5 billion by 2031 as a direct impact on growth and investment.

[5] *'The Eddington Transport Study – The Case For Action: Sir Rod Eddington's Advice to Government'*, December 2006.

The biggest risk to development in the Lee Valley is a lack of early rail investment. Failing to capture this unique opportunity for investment would stifle the stimulus for growth to begin in the first place, dissuading developers and investors and continuing the decline of the industrial and housing base in the area, perpetuating the perceived and actual lack of connectivity that has undermined the Lee Valley for many years.

The London and South East Route Utilisation Strategy (July 2011) identifies capacity as a major issue on the line, not only in order to handle the existing predicted growth, but particularly as regeneration proposals in Meridian Water, Ponders End and other key sites come forward.

The economic growth of the Upper Lee Valley will require further capacity on the mail line in the next decade, while a further layer of turn up and go services on the existing tracks is unlikely to be achievable as research on C2a has demonstrated.

In developing the outputs in this document, the partners have not only looked to create deliverable objectives that will meet the existing needs outlined in the RUS and by partner organisations, but also outputs that will begin to meet the needs of future investment and development in order to allow the Lee Valley to achieve its true potential.

The following section of this conditional output statement provides a very broad outline of the development chronology of the Lee Valley over the coming years through CP5, CP6 and beyond in order that partners can see the additional pressures and new opportunities that exist along the Lee Valley corridor.

DEVELOPMENT TIMELINE

It is important to contextualise the potential rail improvements, and their links to the development and transformation of the Lee Valley. Some aspirational developments such as Battersea Power Station require rail improvements before any development will take place the Lee Valley is in a potentially unique position, where investment and development is already underway. There is more significant investment outlined for the future, and much of the infrastructure is already in place. Where new infrastructure is required, land has already been set aside in the ownership of Network Rail, making delivery very swift and cost effective.

The creation of an improved 4 trains per hour service in the Valley has the potential to kick start development in a way no other intervention can. This raises land values to attract investment, and makes planned developments even more viable, alongside transforming the opportunities for the significant numbers of existing local residents who would like to use the rail services, but can't.

Therefore, to contextualise the potential for growth and investment in the Valley, the Boroughs and partners have brought together a short summary timeline of development in and around station catchments on the West Anglia Line as it runs through the Lee Valley.

To give some sense of certainty and delivery, the timeline looks only at those schemes that are either a) underway, b) been proposed with Planning Permission in place or c) have been confirmed by the Boroughs as corporate priorities for delivery in their respective Core Strategies and the Mayor of London's OAPF.

From initial work, discussions with major developers and soft market testing with investors, it is expected that the delivery of rail improvements will also unlock other schemes and development sites beyond those currently outlined as land values and development potential increases through the Valley.

	Project	Description of Development	Lee Valley Line Linked Station	Estimated Construction jobs	Estimated Number of Residential Units	Estimated jobs
2012	Wilkinson's Edmonton Green	New large scale Wilkinson's Store in Edmonton Green	Edmonton Green	20	0	50
	Tottenham Hotspur commences	Work begins on site for Tottenham Hotspur	Northumberland Park			
	Hale Village	Completion of Hale Village major phase	Tottenham Hale	50	1250	100
	Blackhorse Lane commences	Development of Blackhorse Lane commences	Tottenham Hale			
	Walthamstow Wetlands commences	Development of Walthamstow Wetlands commences	Tottenham Hale			
2013	Oasis Hadley Academy	New academy adjacent to Ponders End Station	Ponders End	130	0	150
	Edmonton Eco Park commences	Development of Edmonton Eco Park commences	Angel Road			
	South Street East: Academy piazza	New entrance piazza to Academy	Ponders End	20	0	0
	South Street East: Station Square	New entrance to Ponders End station	Ponders End	20	0	0
	South Street East: Carriageway	Replacement works to South Street East	Ponders End	50	0	0
	North Middlesex Hospital	Redevelopment of Watermill Lane (221 homes)	Edmonton Green	50	221	0
	Deephams Sewage Works commences	Redevelopment of Deephams Sewage Works commences, with aspiration to use rail freight slots	Angel Road			

2014	Ponders End Park	New community pavilion as final phase of park redevelopment	Ponders End	20	0	0
	View 406 Site	New hotel and business units	Angel Road	150	0	0
	Bell Lane Academy	All through school at Bell Lane	Brimsdown	100	0	0
	Meridian Water Commences	Development of Meridian Water commences	Angel Road	30	110	40
2015	188/216 High Street	Redevelopment to provide residential units and retail	Ponders End	50	100	10
	Queensway Campus Phase 1	Phase 1 redevelopment of campus for residential and minor retail	Ponders End	100	0	200
	Southern Brimsdown Phase 1	Redevelopment of 9ha of business led development	Brimsdown	50	200	10
2016	Queensway Campus Phase 2	Phase 2 redevelopment of campus for residential and minor retail	Ponders End	150	280	1370
	Tottenham Hotspur	Completion of stadium redevelopment and ancillary work	Northumberland Park	150	0	0
	Enfield East Academy	As yet un-named Academy in the East of the Borough around Edmonton	Angel Road / Brimsdown	50	0	30
	Walthamstow Wetlands	Redevelopment of the wetlands to create leisure attraction	Lea Bridge	100	0	200
	Southern Brimsdown Phase 2	Redevelopment of 9ha of business led development	Brimsdown	75	0	0
	Tottenham Free School	Opening of Secondary focused Free School in Northumberland Park	Northumberland Park	50	150	10

2017	Queensway Campus Phase 3	Phase 3 redevelopment of campus for residential and minor retail	Ponders End	300	756	900
	Meridian Water Phase 1 completes	Residential units, 1 primary school, new entrance to Angel Road Station	Angel Road	150	0	20
	Ponders End High Street	Redevelopment of Ponders End High Street, complete with new link to Ponders End Station	Ponders End	150	0	150
2018	Meridian Water Academy	Development of an "All through" school next to Angel Road Station	Angel Road	150	0	150
2020	Edmonton Eco Park	Redevelopment of incinerator and creation of decentralised energy network	Angel Road	75	0	1700
	Edmonton Green Regeneration	Completion of a series of small site redevelopments in Edmonton Green	Edmonton Green	50	700	0
2021	Meridian Water Phase 2 completes	Residential units, 1 primary school, community hub, industrial regeneration	Angel Road	300	935	1020
2022	Alma Towers Regeneration	Redevelopment of Alma Towers in Ponders End, adjacent to Ponders End Station	Ponders End	100	900	10
2025	Northumberland Park Regeneration	Redevelopment of small sites around Northumberland Park	Northumberland Park	50	110	500
2026	Blackhorse Lane	Completion of the redevelopment of Blackhorse Lane	Tottenham Hale	500	2500	1000

2027	Meridian Water Phase 3 completes	Residential units, new industrial regeneration	Angel Road	300	1029	700
2030	Pickett's Lock Regeneration	Redevelopment of Pickett's Lock completed, including major new leisure centre and new station	Pickett's Lock (new station) / Ponders End	150	0	810
2031	Tottenham Hale Regeneration	Completion of the redevelopment of Tottenham Hale, based on new gyratory system	Tottenham Hale	500	4750	4900
2033	Meridian Water Phase 4 completes	Mixed use residential, industrial regeneration, new small retail	Angel Road	300	1219	1226
2036	Small Scale Sites	Estimated delivery of small sites across the OAPF area within 10 mins walk of stations	Various	800	3500	110
2045	Meridian Water Phase 5 completes	Final delivery of the last phase of Meridian Water	Angel Road	300	1101	1569
TOTAL				**5440**	**19811**	**16935**

2012 Hale Village Underway

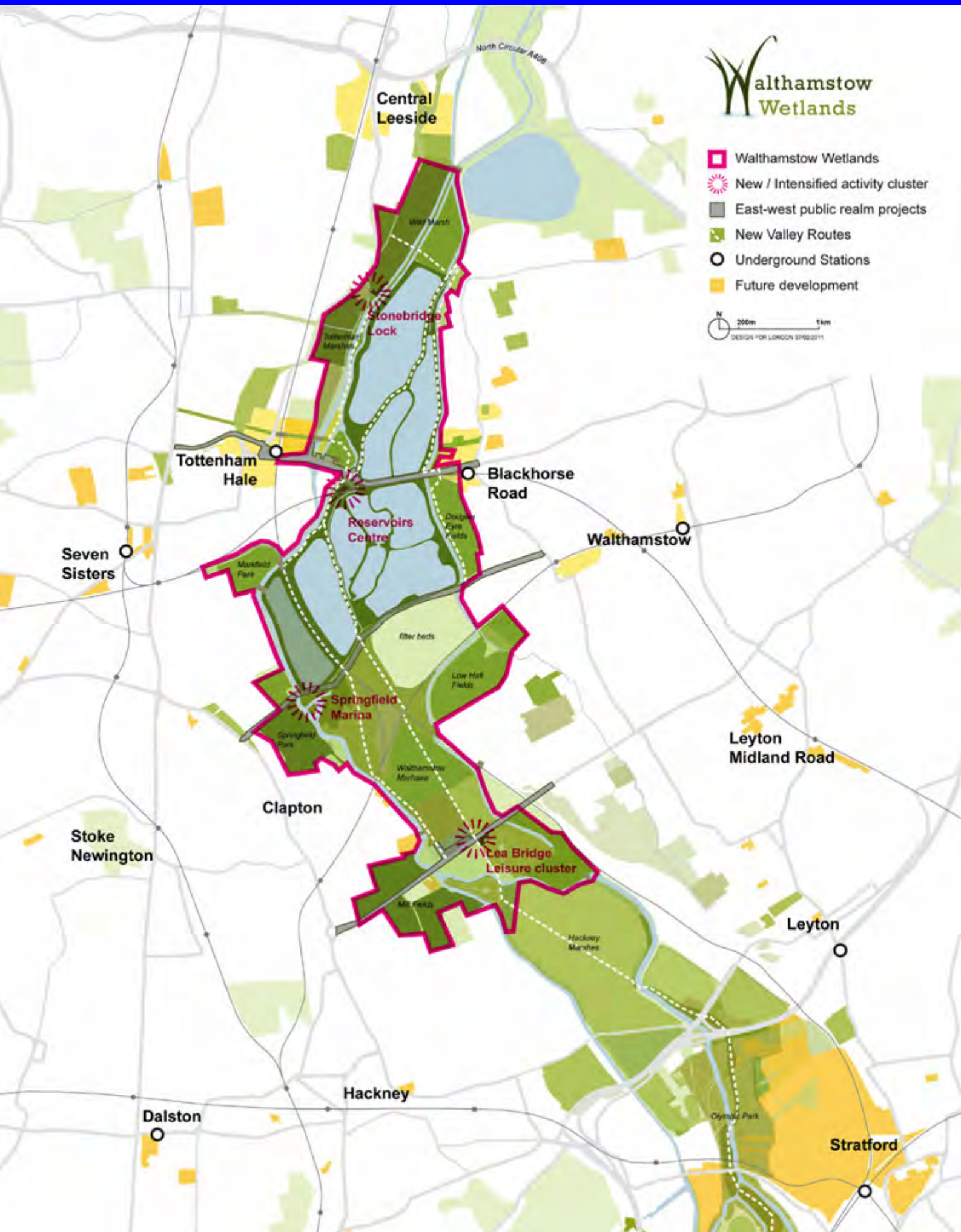
2012 Wilkinson's Edmonton

2013 Oasis Hadley Academy

2014 Ponders End Park

2016 Tottenham Hotspurs

2016 Walthamstow Wetlands



2017 Angel Road Station

2017 Meridian Water Phase 1

2017 Ponders End High Street

2021 Meridian Water Phase 2

2031 Hale Village Complete

2045 Meridian Water Complete

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ANNEXES

ANNEX 1: Membership of the West Anglia Routes Group

Abellio Greater Anglia Ltd
Broxbourne District Council
Cambridge City Council
Cambridgeshire County Council
City of London
Department for Transport
Essex County Council
Harlow District Council
Hertfordshire County Council
London Borough of Enfield
London Borough of Hackney
London Borough of Haringey
London Borough of Newham
London Borough of Tower Hamlets
London Borough of Waltham Forest
London Travelwatch
Network Rail
North London Strategic Alliance
Passengerfocus
Stansted Airport Ltd
Transport for London
Uttlesford District Council

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 fewer outputs with new 2011 timetable [6]
- potential variant with a centre-reversing siding is not compatible with further 3/4 tracking at Brimsdown.

Option C2b:

- 4tph 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 viable 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.

[6] 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."

ANNEX 3: Option STAR (Stratford-Tottenham-Angel Road)

This Annex looks at the potential for delivery options between C2a and C2b, that cost significantly under £100m.

The core requirement from Upper Lea Valley and GLA stakeholders is a 4tph service that drives jobs, new housing and industrial development at key ULV sites, from the earliest practicable date. A fundamentally better 'turn-up-and-go', even interval local rail service is seen as vital, within Control Period 5. The locations of greatest importance are Angel Road, serving Central Leeside and the planned Meridian Water sub-regional centre, along with Northumberland Park whose existing residential wards have the worst deprivation in London and some of the worst across the whole of England.

Stakeholders have taken difficult decisions, to consider constraining short-term large-scale transport objectives to the Stratford-Tottenham-Angel Road sector. They will then rely on development of existing rail services in the next few years to assist growth at Ponders End and Brimsdown, until Control Period 6. This reduces any scheme for three-tracking to just 3.1 miles, north from Coppermill Junction to Angel Road, from 6.6 miles between Lea Bridge and Brimsdown.

There are then two build-up **Elements** which define the potential for an **Option C STAR** service, to achieve **Outputs 1, 2 and 3**:

STAR 1: 4tph between Stratford, Tottenham Hale and Angel Road

- There are already 2tph through trains from further north.
- High level assessment suggests that two trains would be required to provide an additional 2tph between the existing ones, as far as Angel Road, on a mostly even interval. Trains could be inter-worked, alternating journeys to Hertfordshire with trips to Angel Road, to minimise wasted terminus time and to reduce platform occupation at Stratford. [7]
- Operational analysis points to a new 2tph local service avoiding Coppermill Junction and existing platforms at Tottenham Hale, so neither importing nor creating more junction and passenger handling complexity for faster services. Users need a trusted service.
- The infrastructure solution would be to provide a third track from south of Coppermill Junction to a third platform at Tottenham Hale, and an extended third track from there to Angel Road. [8]
- Combined with the 2tph through service, this offers 4tph all day between **Northumberland Park** and Tottenham Hale and Stratford.
- For **Angel Road**, currently with a 1-2tph peak only service and some local trains non-stopping the station, peak-time trains would be a (lumpy) 3tph or (regular) 4tph depending

[7] Timetable modelling indicates that for almost all the traffic day, additional local trains required for Stratford-Tottenham could head as far as Angel Road and back on a third track (with a stop at Northumberland Park) without requiring a third train in service. It would be an extended siding from Tottenham Hale.

[8] From Network Rail's research with Option C2a, it is not expected that an additional 2tph along the main line (making 4tph turn-up-and-go in total) can offer a regular service north of Tottenham Hale, in place of Brimsdown, during the peak or off-peak period. This is for the same reasons as at Brimsdown: the additional trains which were introduced in the December 2011 peak timetable take up too many of the required train slots between Coppermill Junction and the reversing point. Slotting new local trains within main line gaps leads to irregular intervals.

on time and direction. It would reduce to 2tph off-peak unless the existing main line services had their stopping pattern and timings adjusted to allow 2tph more. This is because Angel Road doesn't currently have an off-peak service.

- Basic costs with TfL unit charges are £10-11m for 1.1 miles single track between Coppermill and Tottenham Hale, and £15-16m for 1.8 miles north to Angel Road. This includes points, signals, civil engineering and new single platforms at three stations (Tottenham Hale, Northumberland Park and Angel Road).
- There is a separate allowance for power supply [9].
- Costs are inflated by 120% charges for design, project management, risk and contingency, but not optimism bias.
- **Output 4** is essential – removal of the level crossing at Northumberland Park, and provision of a local replacement for pedestrians and cyclists by 2015. £3m is allowed for this.
- Based on TfL unit costs, this could be a total infrastructure capital cost for **STAR 1** of ca. **£72m** between Coppermill and Angel Road. [10]

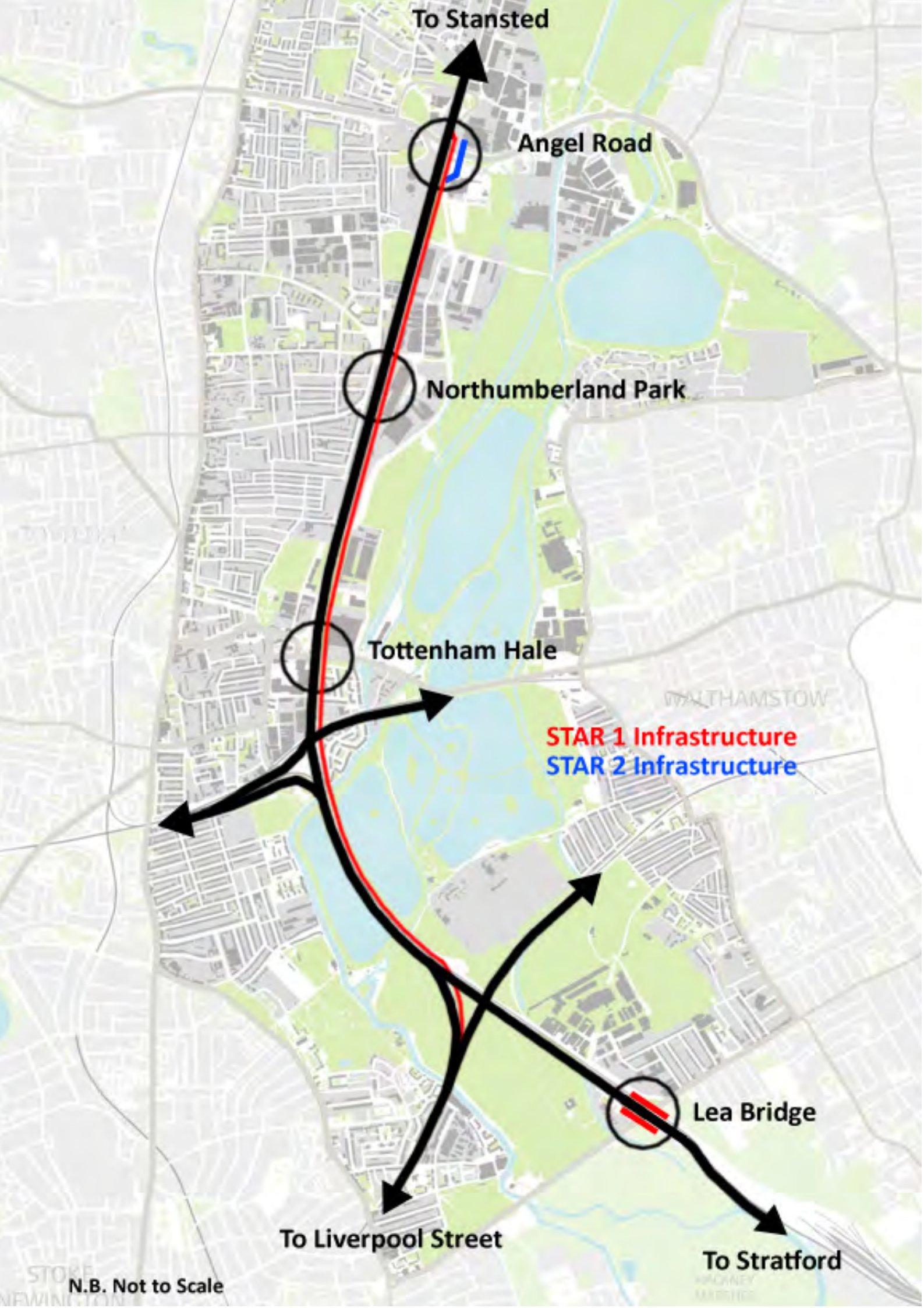
STAR 2: 4 tph at Angel Road and Northumberland Park (part of Output 1), based on 2tph through and 3-4 tph Stratford – Tottenham Hale – Angel Road

This is only required in the situation that it is not possible to add 1 additional tph at Angel Road at peak times on the main line (to create 4tph), and/or off-peak services at Angel Road are constrained below 4tph.

- The infrastructure would essentially be the same as in STAR 1 above, but with a double-track terminus at Angel Road, to allow a third local train in service between Angel Road and Stratford, allowing 3 or 4tph, alongside through trains.
- Additional signalling, track and pointwork and a fourth platform would raise the basic capital cost north of Tottenham Hale.
- Total **STAR 3** cost between Angel Road and Stratford, including Elements 1 and 2, would be ca. **£81m** excluding optimism bias.
- There would be a higher operating cost with a third local train in service.

[9] £15m is the LSE RUS differential in Option C2b between core costs and costs plus power supply.

[10] Note that Lea Bridge station costs are excluded as the station is broadly self-funding using a Section 106 contribution from Westfield. (Output 3)


To Stansted
Angel Road
Northumberland Park
Tottenham Hale
STAR 1 Infrastructure
STAR 2 Infrastructure
Lea Bridge
To Liverpool Street
To Stratford
N.B. Not to Scale


Waltham Forest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