

Long Marston Transport Study

– Appraisal of Transport Links to Stratford-upon-Avon via the Greenway

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INTRODUCTION

1.1 PURPOSE OF REPORT

This report summarises the work undertaken by SLC, on behalf of Mode Transport, to carry out a high level option appraisal for a new public transport connection between the site of the former Long Marston Airfield (the Airfield) and Stratford-upon-Avon (Stratford) via the existing Stratford Greenway. The new transport connection will support a new housing development on the Airfield that is being promoted by CALA Homes. Subject to the proposed further investigation highlighted herein, this report could be developed to form part of an evidence submission to Stratford District Council ahead of an Examination in Public (EiP) on the housing development, expected to be held in September 2014.

SLC have been commissioned to investigate three modes of transport that have the potential to provide a high quality, efficient and reliable link between Long Marston and Stratford. The three modes of transport are:

- **BUS** – Specifically Bus Rapid Transit or dedicated ‘Guided Busway’
- **LIGHT RAIL** – Either a tram or ‘tram-train’ solution
- **HEAVY RAIL** – An extension of the existing Birmingham to Stratford railway

In undertaking the option appraisal, SLC has assessed four key areas of study:

- **DESIGN** – Requirements & feasibility of delivery
- **SERVICE CHARACTERISTICS** – Capacity of the route and the expected service frequency
- **INTEGRATION** – With the housing development, Stratford town centre & existing transport
- **COSTS** – Indicative capital costs and operating costs

In delivering the option appraisal, SLC has engaged design consultants Mott MacDonald (MML) to assess the technical aspects of each transport mode. Specifically, MML has focussed on the design requirements and the indicative capital cost estimate of each option. In addition, they reviewed the findings of the Heavy Rail study previously produced by consultants Arup on the ‘Stratford to Honeybourne Railway’ (see Section 2.2 for further detail) to inform the findings of the Heavy Rail option.

The results of the appraisal will be presented within a matrix assessment to assist in the identification of potential options to be taken forward by CALA Homes for further development.

BACKGROUND

2.1 LONG MARSTON DEVELOPMENT

CALA homes are proposing to deliver a 3,500 unit development on the site of the former Long Marston Airfield, Warwickshire. The 205 hectare site is situated approximately 5 miles south-west of Stratford-upon-Avon and the town will undoubtedly act as a key destination for a significant proportion of the residents of the new housing development. However, it is likely that the other key conurbations such as Worcester, Evesham and Oxford will also generate significant numbers of trips from the site as residents travel there to access employment, retail and service opportunities.

Long Marston used to be linked to Stratford via the national rail network with a line running from Honeybourne (on the North Cotswold Line) to Birmingham via Stratford-upon-Avon. However, traffic on the line gradually declined during the 1960s & 1970s and eventually in 1976 the line between Stratford and Long Marston was closed¹. The former track-bed was subsequently turned into a leisure route for pedestrians and cyclists. The ‘Stratford Greenway’ as it has become known has effectively safeguarded the route against being severed by development and the creation of 3,500 new homes at Long Marston now presents the opportunity to re-instate a high quality, sustainable, transport link between the town and this new settlement.

2.2 STRATFORD TO HONEYBOURNE RAILWAY REINSTATEMENT STUDY

In 2012, consultants Arup were commissioned to produce a report investigating the feasibility of re-instating the heavy rail link between Honeybourne and Stratford, via Long Marston. The report was commissioned by a consortium of interested parties, primarily concerned with the wider network benefits that the reinstated link would provide, along with the benefits to Stratford as a key tourist and economic ‘hub’ in the south Warwickshire region.

Arup primarily investigated what infrastructure requirements were necessary to reinstate the line, with particular focus being given to overcoming key pinch points, such as those at the northern end of the Greenway by the ‘Seven Meadows’ Roundabout. This report has provided a contemporary basis from which to evaluate the feasibility of a Heavy Rail link from Long Marston to Stratford, both in terms of engineering feasibility and capital cost implications. MML’s development of the Arup report findings and resulting considerations can be found in Sections 7 of this study.

PURPOSE OF THE TRANSPORT LINK

3.1 OVERARCHING PURPOSE & BENEFITS

With any new development, it is important to maximise accessibility for residents, visitors and employees who will travel to and from the site on a daily basis. Indeed, this is one of the key policy tests set out in the ‘National Planning Policy Framework (2012)’² The provision of a sustainable public transport link reduces the reliance on the private motor car, mitigates the development’s impact on the local environment and promotes economic growth. The rural location of the Airfield site only increases the onus to seek a suitable level of provision.

There are a number of specific benefits to CALA homes in exploring the creation of a new public transport link along the alignment of the Stratford Greenway:

- It would contribute towards the sustainability objectives of the new housing development (as noted in sections 4.4.7 and 4.4.9 of the ‘Sustainability Appraisal of the Stratford-on-Avon Alternative Strategic Options’³ report);

¹ Potts, C.R. 1985. *A Historical Survey of selected Great Western Railway stations (Volume 4)*. Poole, Dorset: Oxford Publishing Co. ISBN 978-0-86093-191-1.

² Department for Communities & Local Government. 2012. *National Planning Policy Framework*. Available at: <http://planningguidance.planningportal.gov.uk/wp-content/themes/planning-guidance/assets/NPPF.pdf>

³ Lepus Consulting. 2014. *Sustainability Appraisal of the Stratford-on-Avon Alternative Strategic Options*. Available at:

<https://stratford.gov.uk/files/seealsodocs/148811/Sustainability%20Appraisal%20of%20the%20Stratford-on-Avon%20Alternative%20Strategic%20Options%20-%20Jan%202014.pdf>

- It will contribute to the objectives of the National Planning Policy Framework: Transport (2012);
- It would help achieve modal shift away from the private car, thus contributing towards improvements to the already congested strategic road network in and around Stratford;
- It would contribute to the objectives found within the Warwickshire 3rd Local Transport Plan (2011 – 2026) on tackling climate change, reducing greenhouse gas emissions and improving accessibility;
- It will increase accessibility to local services and employment centres, supporting economic growth and regeneration; and
- It will much better integrate the development with Stratford and the wider sub-region by providing direct connections with existing ‘mass transit’ transport options such as the national rail network.

The existence of the safeguarded Stratford Greenway running adjacent to the western edge of the development poses significant advantage to any of the three transport options. There are very few development sites on the scale of the Long Marston Airfield that have the potential to be sustainably linked to a major conurbation such as Stratford-upon-Avon, without major land purchase and infrastructure obligations. Given that the Airfield site has the potential for additional future development, the existence of such a significant public transport link could act as a catalyst for further sustainable growth. It should be noted that each of the three transport options has been considered with this (and the potential need to add extra capacity) in mind.

ASSESSMENT OF OPTIONS

4.1 COMMON CONSIDERATIONS

SLC have been commissioned to assess three public transport options for the route between Long Marston and Stratford – Bus, Light Rail and Heavy Rail. Each mode has its own merits, which will be explored in detail in Sections 5 – 7 of the report. It is worth noting that there are a number of considerations common to each of the three options which are explored in Sections 4.2 - 4.4 below.

4.2 CONNECTION AT STRATFORD-UPON-AVON

There are two key centres in Stratford which it would be useful for the new public transport link to integrate with; these are:

1. The town centre – with its retail, leisure and services functions; and
2. The mainline railway station – offering connections to Birmingham and London and the wider sub-region.

Given the characteristics of Stratford town centre, with its narrow streets, high density of development and multitude of buildings with historic importance, it will be easiest to integrate the Bus option. Buses are able to use the existing highway network when not running on dedicated guided bus lanes and measures can be put in place to improve bus-priority. However such measures cannot completely eliminate the potential for delay caused by congestion unless dedicated bus lanes are constructed.

Light Rail has the potential to run on, or alongside, the existing highway network where space permits and can be sensitively integrated into the urban environment thus providing good integration with

the railway station and the town centre. Light Rail schemes may be more readily accepted because they are often seen as a 'modern' solution to public transport issues and one which has little visual intrusion when the units are not running.

Heavy Rail can only run on dedicated railway lines. This means that it can be directly linked to the mainline railway station, but not the town centre. This is not necessarily a problem as people are more willing to walk / cycle to access mainline rail connections than they are in order to catch a bus or use light-rail systems. The existing railway station is approximately 700m from the town centre and this is considered to be a reasonable distance to walk or cycle.

It should be noted that in order to connect the Heavy Rail option with Stratford Station, and to avoid impacting on the existing residential properties and the local road network, a tunnel would need to be constructed beneath Seven Meadows Road and Evesham Place. The Arup study has shown this to be a feasible, but expensive solution.

In terms of cost and sensitivity of intrusion, Bus or Light Rail would therefore be more suitable to integrate directly with the town centre. However, Heavy Rail has a distinct advantage by offering direct services to and from the development via connection with the national rail network at Stratford station and Honeybourne.

4.3 CONNECTION AT LONG MARSTON

Integration of the public transport link at Long Marston is more straightforward as land has already been safeguarded for the creation of a new station immediately to the west of the new housing development. From review of the CALA Homes Masterplan it is clear that the layout of the development can be designed to offer a convenient 'green corridor' thoroughfare for residents which will encourage access on foot or cycle. It is noted that the land for the station is only safeguarded on one side of the Greenway, which may preclude a 2 platform station; however for the initial levels of demand it is envisaged that a single platform station could suffice.

Whilst the Heavy Rail option can only run parallel to the site, the Bus and Light Rail options can be more easily accommodated into the heart of the development. With careful design it would be possible to sensitively and efficiently integrate either option into the central circulatory road that links the housing, employment & service centres; thus offering a very convenient connection not only for residents but also employees who may live remotely but commute into the area. Evidence has shown that the more accessible public transport is, the more likely that people will 'shift modes', particularly when they have moved to a new area and are establishing new transport patterns⁴.

4.4 PASSENGER DEMAND

The type and nature of demand arising from the development will affect which of the three modes is likely to be the most commercially viable in the long term. Given the proximity of the Airfield site not only to Stratford but also to Worcester, Evesham and, slightly further south, to Oxford it is envisaged that demand will be spread across the sub-region. Transport links that offer the best level of

⁴ Department for Transport. 2008. *Building Sustainable Transport into New Developments: A Menu of Options for Growth Points and Eco-towns*. Available at: <http://laqm.defra.gov.uk/documents/sustainabletransnew.pdf>

integration with existing public transport networks are therefore likely to be the most commercially viable.

Bus and Light Rail will by nature offer less integration with the existing mass transport links in the region – which notably are the Heavy Rail lines in Stratford and Honeybourne – but they have an advantage in offering better local levels of accessibility. The Heavy Rail option also offers wider network benefits that help to justify the business case.

To illustrate this point, the Arup study notes that a new railway station at Long Marston will generate approximately 30,000 trips per annum but thanks to the creation of a new ‘link’ on the rail network a total passenger demand of between 430,000 – 460,000 trips per annum will be generated (depending on which design option is delivered). Neither the Bus or Light Rail options present the opportunity to capture these wider network benefits nor with them the potential for shared scheme costs over the multitude of beneficiaries.

BUS LINK

5.1 SUMMARY DESCRIPTION OF OPTION

Under this option, a Guided Busway would be provided between the Airfield and Stratford, following the alignment of the Greenway until the route reached Seven Meadows Roundabout. From this point forward it would route on the existing highway network. As outlined in Section 4.2 above, the main issue for this option will be the adequate and reliable access to Stratford Town Centre given the constraints of the local highway network and the congestion prevalent at peak times.

This can be offset to some degree if the route only serves the town’s railway station however this would affect the commercial performance of any service and therefore negatively affect the value for money case.

The Guided Busway would be easily able to integrate with the heart of the Long Marston site via the development’s circulatory road. However, if the project needed to be de-scoped, this extension to the route is not strictly necessary as other recently completed schemes (such as the Cambridge guided Busway) have shown that passengers are prepared to walk or cycle longer distances to access such a public transport provision than they are for a conventional bus interchange.

The advantage of a bus system compared to other modes is that there is no need to segregate the system from normal highway traffic. Buses fitted with guidance systems can run on normal highway, where necessary, with a relatively low level of priority infrastructure, such as bus lanes and forms of ‘intelligent’ transport signalling at junctions. In this particular location the system could operate between Long Marston and Seven Meadows road on a guidance system and then join the public highway, with appropriate priority given at key junctions en route to the Rail Station or Town Centre. To achieve the highest frequency and reliability, the system should be double track throughout. Unfortunately there is insufficient land available adjacent to the existing highway network to provide a segregated route through into Stratford.

To ensure the success of the scheme, it would be necessary to consider variations to car park charges in Stratford. This is because journey times on the bus are similar to the private car and charges would need to be raised to make use of the private car less appealing, particularly for long-stay parking. Any such changes would need to be made by, and with the full support of, Stratford-on-Avon District

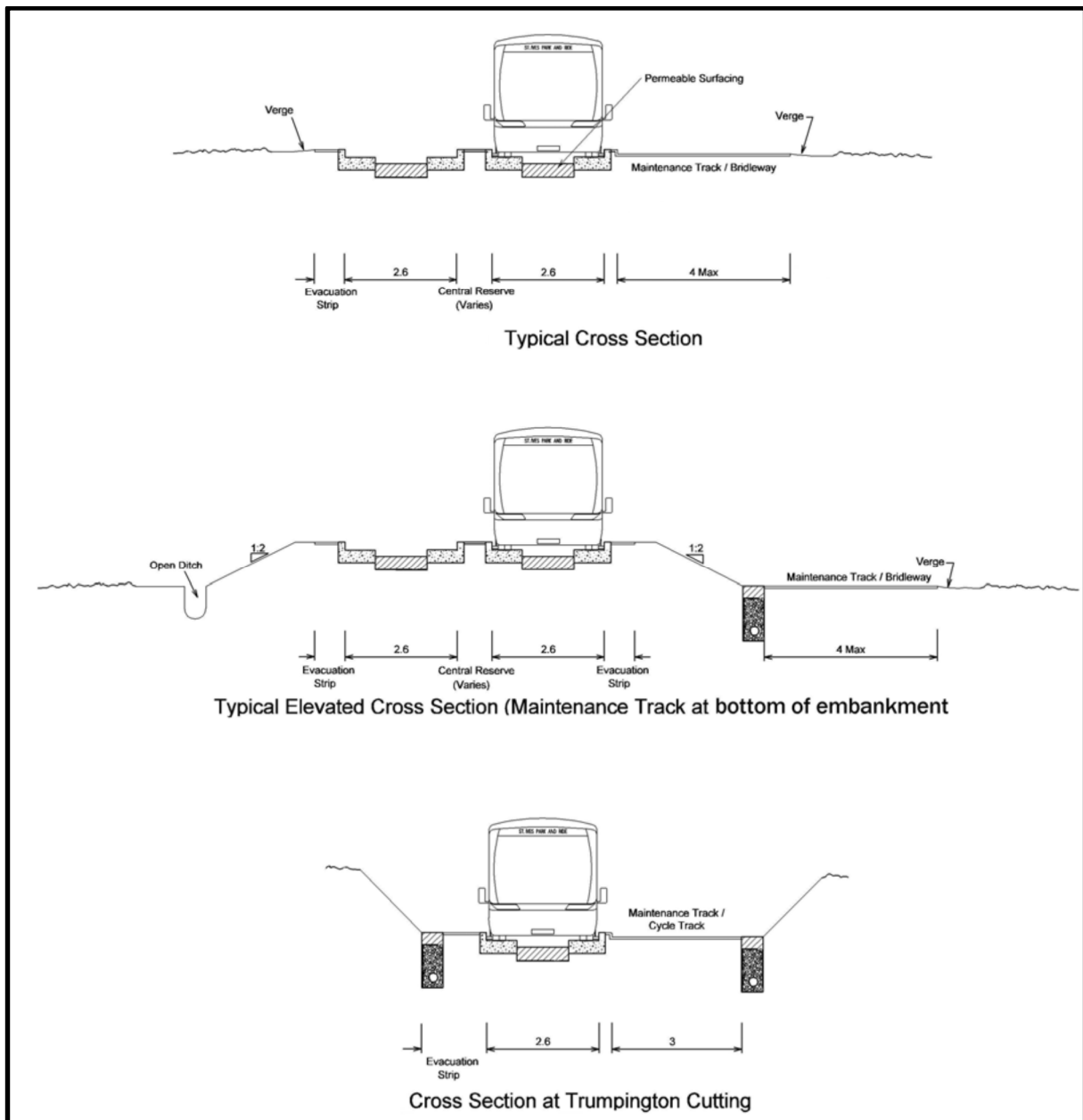
Council. It is noted that in recent years similar changes to parking charges in Stratford were proposed to support the Bus Park & Ride but were unsuccessful.

The service could be operated with high quality environmentally friendly / hybrid buses with Wi-Fi and comfortable interiors to enhance the appeal of the service to passengers over and above the private car.

5.2 INFRASTRUCTURE REQUIREMENTS

The installation of a twin section of Guided Busway between Long Marston and Seven Meadows Road could use a shallow track-slab system, such as PCAT (Pre Cast Advanced Track), similar to that described under the Light Rail option (Section 6). PCAT systems are designed to minimize the cost of a precast track bed, whilst increasing the speed and reliability of construction. This will have benefit should it be decided at a later date to upgrade the route to a Light Rail system.

A typical cross section of precast Guided Busway is shown below:



The example being taken from the recently completed Cambridge Guided Busway⁵

The Seven Meadows Roundabout will need to be modified to a 'burger' roundabout (a bus only link through the middle of the traffic island) with appropriate traffic signals and re-alignment. The highway from Seven Meadows Road to the Town Centre or Rail Station will need to be given bus priority measures.

Alternatively, provided the full width of the old railway alignment along Summerton Way has been safeguarded there should be sufficient width to construct a twin track Guided Busway direct to Stratford Town Station. When buses reached Stratford Station they could use the new transport interchange being constructed as part of the Cattle Market development and loop round via Western Road / Birmingham Road to re-join the Busway south to the Airfield.

Infrastructure requirements to facilitate operation, maintenance and servicing of the buses would need to be agreed with the Operator once the mode had been selected for further development work.

SPACE REQUIREMENT

A typical dimension for a double track Guided Busway is approximately 6 metres, which allows for an evacuation strip and two 'running lines'. Additional space to the side of this would be required to keep the Greenway operating as a sustainable link for pedestrians and cyclists. In order to maintain a cycleway along the Greenway an additional 4 metre wide strip would be required. Depending on land ownership it may be possible to achieve this on an embankment; otherwise land would need to be purchased. A detailed topographical survey would be required to establish the exact width of the Greenway route.

5.3 SERVICE PATTERN & ROUTE CAPACITY

Based on modern double deck buses with a capacity in the region of 70 passengers per bus, a frequency of 5 minutes would provide 840 seats per hour. This level of capacity would probably be an over provision, certainly in the inter peak hours, and it is likely that a reduced inter peak/ off peak service would be introduced to improve the commercial viability of the service. Again, detailed discussions with an Operator and an in-depth business case analysis would confirm the optimum service pattern.

The double track section is estimated at approximately 6Km; assuming an average speed of 55Km/hr. it would take 7 minutes to run on this section. The full length of route is approximately 8.5Km long, however, given the clear restrictions of on highway running a cautious speed of 25Km/hr. is assumed. For the on-highway section of the route this would result in a journey time of 6 minutes. The total end to end run time would therefore be approximately 13 minutes.

⁵ <http://www.cambridgeshire.gov.uk/NR/rdonlyres/76D68D25-DD2B-44C2-8419-7630D7BD38BE/0/StatementofCase.pdf>

5.4 COSTS

A high level construction cost estimate based on estimated outturn costs of recently completed, similar, schemes is outlined below:

Guided Busway – twin track pre-cast concrete:	6.0km at £5.6M/Km	=	£33.6M
On-highway Bus Priority Measures:	2.0km at £2.5M/Km	=	£5.0M
Purchase of 7 no. Hybrid Buses:	7 at £0.2M/unit	=	£1.4M
		Total	= £40.0M

These costs are indicative only and should only be used for comparison purposes.

Operating costs will need to be considered as part of the Business Case analysis for the scheme, however in very high level terms, assuming a frequency of 5 minutes and a return journey time, including layover, of 30 minutes 6 buses would be required to serve the Guided Busway at an estimated operating cost of £1.2M p.a.

This figure does not take into account the revenue generated through the operation of the service. It is likely that the service would require initial operational subsidy, particularly if construction took place before all phases of the development were complete. The business case would also be heavily reliant on nearly all of the residents of the development wishing to travel north to Stratford and beyond, whereas in reality it is likely that residents will also want to travel south or west to Evesham, Worcester and Oxford (as has been assumed in the Arup demand model for the Heavy Rail link). Guided Busway is therefore unlikely to be as commercially viable in the long term as a Heavy Rail option because of the more limited market that it would serve.

5.6 FEASIBILITY OF DELIVERY

Technically the delivery of a Guided Busway service from Stratford to the proposed Airfield development site would appear to be feasible. This is particularly true if pre-cast concrete slabs are used to construct the track bed; reducing the need for foundation works and intrusive on-site works. However, the ability to provide realistic and sustainable bus priority from the end of the Guided Busway to the Stratford town centre or rail station will pose challenges.

As referred to in Section 5.1 above, the issue will be easier to address should it be decided to serve the rail station only, using the existing Greenway cycle route along Summerton Way. However this is likely to affect the business case and may be unduly disruptive to residents along that section of route.

5.7 OTHER SIMILAR EXAMPLES

In recent years a number of successful Guided Busway systems have been developed and brought into operation. Examples include:

- **‘EDINBURGH FASTLINK’** - operated by Lothian Buses this scheme was made up of a group of bus priority improvements and a 1 mile (1.5 km) section of Guided Busway.
- **‘LEEDS SUPERBUS’** – operated by First Leeds this scheme was made up of bus priority corridors with sections of Guided Busway. The first phase opened in 1995 with four sections of Guided

Busway (totalling 1 mile / 1.5km) and the second phase opened in 2001 with three further sections of Guided Busway (totalling 1 mile / 1.5km).

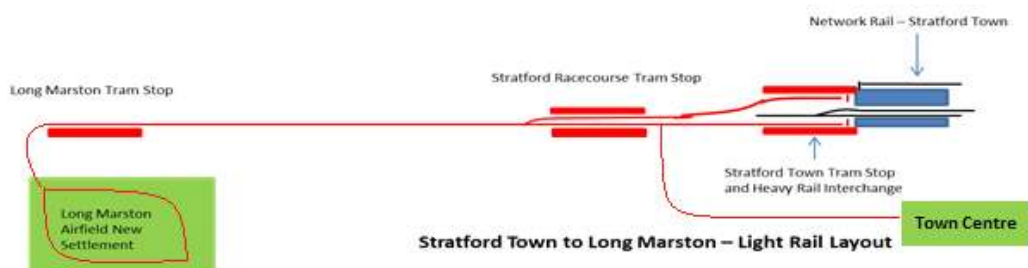
- **‘BRADFORD MANCHESTER ROAD QUALITY BUS INITIATIVE’** – the Bradford end of the route including 1 mile (2.3 km) of guided Busway - opened October 2001
- **‘CRAWLEY FASTWAY’** - a 15 miles (24 km) twin track Bus Rapid Transport system with segregated lanes and 1 mile (1.5 km) of Guided Busway which opened in December 2004
- **‘LUTON TO DUNSTABLE GUIDED BUSWAY’** – this route runs between Luton Airport and Houghton Regis, via Dunstable, following the alignment of the Dunstable Branch Lines which closed in 1989, running parallel to the A505 (Dunstable Road) and A5065 (Hatters Way). The Busway runs for 6.1 miles, of which 4.8 is guided track with a maximum speed of 50mph. The £80 million scheme opened in September 2013.
- **‘CAMBRIDGE GUIDED BUSWAY’** – this is a BRT corridor which incorporates 16 miles of guided Busway, it opened in February 2009 and in August 2011 it was extended to include the Trumpington Park & Ride. This scheme has been very successful with a growth in patronage of 25% recorded from June 2012 to June 2013. The original scheme budget was £126m (including land purchase and construction costs)⁶.

LIGHT RAIL LINK

6.1 SUMMARY DESCRIPTION OF OPTION

The Light Rail link would run on a dedicated track bed between the Airfield and the outskirts of Stratford via the land safeguarded by the Greenway. From there the advantage of a Light Rail system, compared to a Heavy Rail system, means that there would be no need to segregate the system from normal highway traffic and it would continue on road. The tram system would integrate with, and act as a shuttle between, Stratford railway station and the development on a dedicated line with no interface with Network Rail infrastructure. The tram system could be twin track from Stratford railway station along Summerton Way and Seven Meadows Road (A4390) to a new Racecourse Station located at the east end of the course. South of this point the track would become a single line along the Greenway to a new station west of the development site. The advantage of on-street running with this option means that the Light Rail system could then run around the central distribution road of the new development, in order to better integrate with the key residential and employment zones.

An indicative route map is provided below:



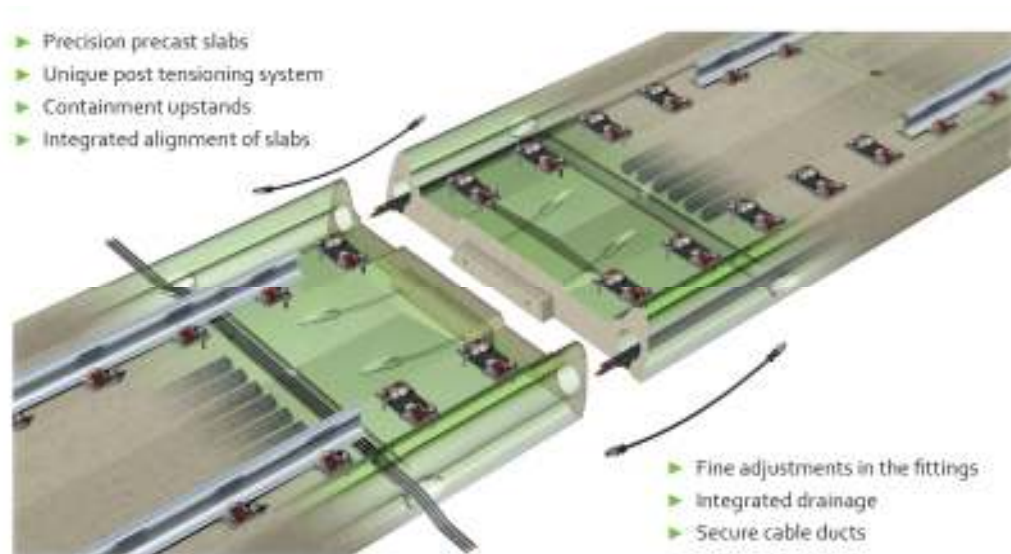
⁶ Cambridgeshire County Council. 2013. Available at: <http://www.cambridgeshire.gov.uk/CMSWebsite/Apps/News/Details.aspx?ref=1101>

6.2 INFRASTRUCTURE REQUIREMENTS

The proposed tram system does not need a complex signalling system and is fully compatible with highway traffic lights. Technological advances mean that construction can be undertaken using pre-fabricated components, manufactured 'off-site', which would increase the speed and efficiency of the delivery phase. The installation of the twin section of track could be undertaken in two phases (ground preparation works followed by track installation), if a shallow track-slab such as 'PreCast Advanced Track' (PCAT) is installed, without the need to divert utility services. This would achieve significant savings on the construction cost but would be subject to statutory undertaker's agreement. PCAT is a revolutionary new track bed solution for modern transport systems, designed to minimize the construction cost of a precast track bed, whilst increasing the speed of build for railways, trams and guided bus routes. A further advantage is that long term maintenance costs are reduced all PCAT slab systems are removable in modules, allowing easy access to the sub-grade or to the utility services that may be in the ground below the track bed.

PCAT City Metro's modular design and unique jointing system incorporates up to 30% weight reducing longitudinal ducts for service cables and drainage outlets providing major benefits over existing metro slab track types. This design would be ideally suited to the on-street running sections of the route in Stratford from Seven Meadows Road north towards the Town Centre.

A typical section of the PCAT modular track bed is shown below:



Reference PCAT Website 2014⁷

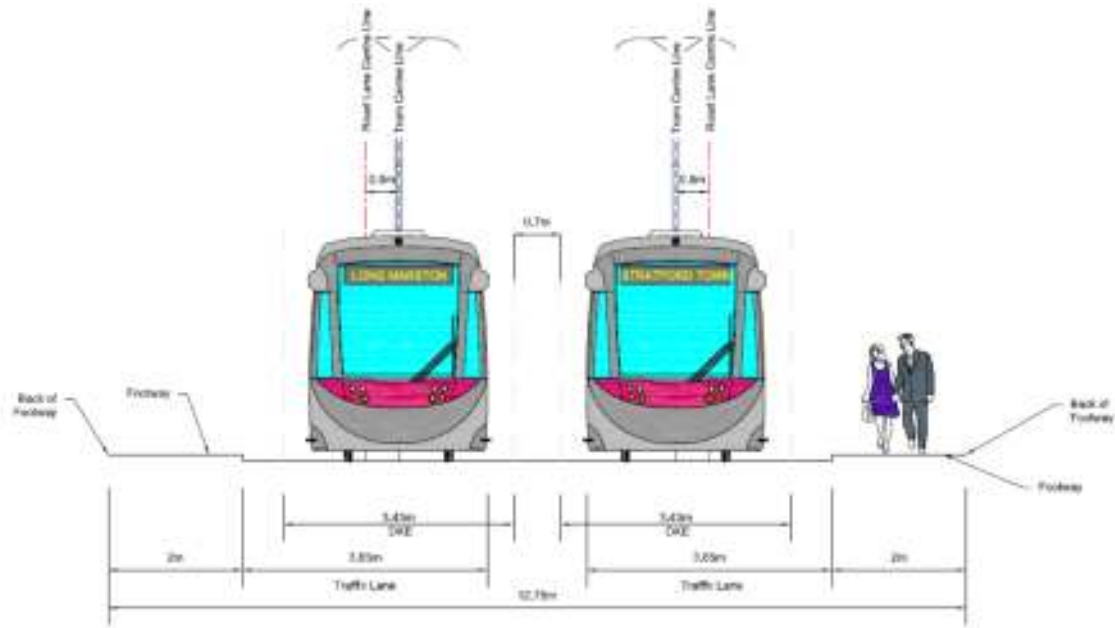
On the single track section of the route from the Racecourse to the Airfield site, the pre-cast system would be employed. However, to prevent future abortive work and cost it may be prudent to install a heavy rail track and formation to Network Rail design standards along this section of the route so that if a heavy rail / freight service was subsequently commissioned this section of track can remain in place without the need for further work. This scenario would need to be considered in the context of whether sufficient funding could be secured in the future to construct a dive-under structure below

⁷ <http://www.precastadvancedtrack.com/>

the A4390, and whether there would be a robust business case to support this upgrade, which had the full backing of Network Rail and other key industry stakeholders.

Space Requirement

A typical dimension for a street running twin track Light Rail System is 12.78m which allows for twin tracks plus a footway on each side. A typical cross-section is shown below:



If a twin track was installed along Seven Meadows Road (A4390) and there was sufficient clear carriageway width, a 500mm offset distance from the road centre line to the tram track centre line would stop vehicular traffic from having to run directly on the rails. To achieve this a 8780mm wide carriageway between kerbs would be required and this may be possible as there is approximately a 2000mm wide grass verge on the eastern side of the road which could be reconstructed to become part of the carriageway.

Providing the full width of the old railway alignment of Summertown Way has been safeguarded there should be sufficient width to construct a twin track Light Rail system into Stratford Town Station. However it is considered that the following works would be required:

- the existing cycleway and footway would need to be closed & diverted;
- the Evesham Road/Seven Meadows Road roundabout would need to be realigned or replaced with a signalised junction to allow trams to traverse the roundabout; and
- the existing roundabout at the south end of Seven Meadows Road will need to be realigned or replaced with a signalised junction to allow trams to traverse the roundabout onto The Greenway.

It should also be noted that in order to maintain a cycleway along The Greenway it would be necessary to install a single track section of Light Rail track from the Stratford Racecourse Stop to the Airfield

site. The minimum width for a segregated tramway with a continuous segregation fence would be 4030mm (DKE + 600mm) which should leave sufficient room for a combined cycle/walkway.

Overhead Line

To support the running of the tram the trams cars themselves would be powered by Overhead Line Electrification (OLE). The visual impact of the OLE will be a key factor in any planning application and during the design phase careful consideration of the OLE structure types, positions, foundation construction and the interfaces with the proposed stop infrastructure. The OLE design will use the permanent way alignment and the topographical survey model to develop the OLE layout plans. These will show the position and configuration of the overhead catenary equipment and the associated supporting structures.

It should be noted that for short sections of the route it is possible for trams to operate on battery power alone. This option could be considered if the route is extended into the centre of Stratford; thus avoiding the need for visually intrusive OLE. Dual mode trams (OLE and battery powered) would be more expensive than those powered by overhead wires alone but the benefits are considered to outweigh the potential costs (financial and otherwise) associated with installing OLE equipment in the town's historic centre.

Depot

In order to maintain the tram vehicles a new maintenance depot would be required along the proposed route to undertake routine maintenance. A suitable location would be south of Station Road, Long Marston utilising land associated with the industrial park heavy rail depot.

6.3 SERVICE PATTERN & ROUTE CAPACITY

Given that the Light Rail system is not connected to the National Rail Network at Stratford, the service frequency will be dependent on the number of units procured and the time taken to clear the single track section along The Greenway to the proposed tram stop at Long Marston. This single track section would be approximately 6Km long; assuming an average speed of 70Km/hr it would take just over 5 minutes to clear the section. The full route length is approximately 8.5Km long which would give an end to end run time of approximately 10 minutes. There is the potential therefore to run 6 trams per hour in each direction.

It is proposed that 2 car trams would be provided, with capacity to carry 100 passengers per car. The total capacity would therefore be 1200 passengers per hour. This level of capacity would probably be an over provision, certainly in the inter peak hours, and it is likely that a reduced inter peak/ off peak service would be introduced to improve the commercial viability of the service. Again, detailed discussions with the prospective Operator and an in-depth business case analysis would confirm the optimum service pattern.

A typical 2 car tram is shown below:



6.4 COSTS

A high level construction cost estimate based on estimated outturn costs of recently completed, similar, schemes is outlined below:

Twin Track – precast concrete slab	2.5km at £13M/km	=	£32.5m
Single Track – precast concrete slab	6.0km at £8M/km	=	£48.0m
	Total	=	£80.5m

These costs are indicative only and don't include for potential service diversion costs, depot or rolling stock provision and should be used for comparison purposes only.

6.5 FEASIBILITY OF DELIVERY

Technically the delivery of a Light Rail shuttle service from Stratford to the proposed development site via an intermediate stop at the racecourse would appear to be feasible. However, a full business case evaluation would need to be undertaken to assess the likely patronage of a new service and whether there would be any future demand to extend the service to Honeybourne Station so that passengers can transfer on to the National Rail network.

The use of precast concrete track beds would dramatically reduce the amount of construction works required to deliver the scheme, and would be less intrusive into the existing landscape. Careful consideration will be required to ensure that the scheme does not exclude use of the Greenway to pedestrians and cyclists and to facilitate sensitive integration with the historic centre of Stratford.

6.6 OTHER SIMILAR EXAMPLES

In recent years a number of successful Light Rail systems have been developed and brought into operation. Examples include:

- **‘MIDLAND METRO’** – the first line of the Midland Metro tram system runs from Birmingham Snow Hill to Wolverhampton (operated by National Express), a distance of just over 12½ miles. Most of the route uses the alignment of the former Great Western Railway Snow Hill–Wolverhampton Low Level line, sharing it most of the way to West Bromwich with the present-day Snow Hill–Stourbridge main line railway route. The alignment is wide enough for four tracks as far as West Bromwich, with the tramway using two tracks and the rest of the alignment given over to main line railway or, through West Bromwich, a public footpath. The final section into Wolverhampton involves a little over a mile of street running along the A41 Bilston Road, most of which is shared with other traffic (see photograph below).

The total system cost was £144.8m, of which central government grants and loans accounted for £80m, with £31m coming from the European Regional Development Fund. The West Midlands Passenger Transport Authority provided £17.1m and Altram contributed £11.4m⁸.



- **‘CROYDON TRAM’** – an 18½-mile light rail network serving Croydon, a major population centre in the south of Greater London, and the surrounding areas. The nucleus is a one-way loop through the streets of Croydon town centre, and three lines radiate from here to Wimbledon, Addington and Beckenham Junction; there is also a short branch from the Beckenham Junction line to Elmers End. Much of the network uses former railway lines with street running around the centre of Croydon. Of the £200m project cost, Tramtrack Croydon Limited contributed £75m, with central government covering the remainder in view of the general significance for London⁹.
- **‘Sheffield Supertram’** - opened on 21st March 1994, the second of the new-generation street-running trams and the result of planning dating back to the 1970s. Initially known as South Yorkshire Supertram, the system was publically owned and operated to start with, but

⁸ www.railway-technology.com/projects/midland/. Accessed 13/03/14. Available at: <http://www.railway-technology.com/projects/midland/>

⁹ www.railway-technology.com/projects/croydon/. Accessed 13/03/14. Available at: <http://www.railway-technology.com/projects/croydon/>

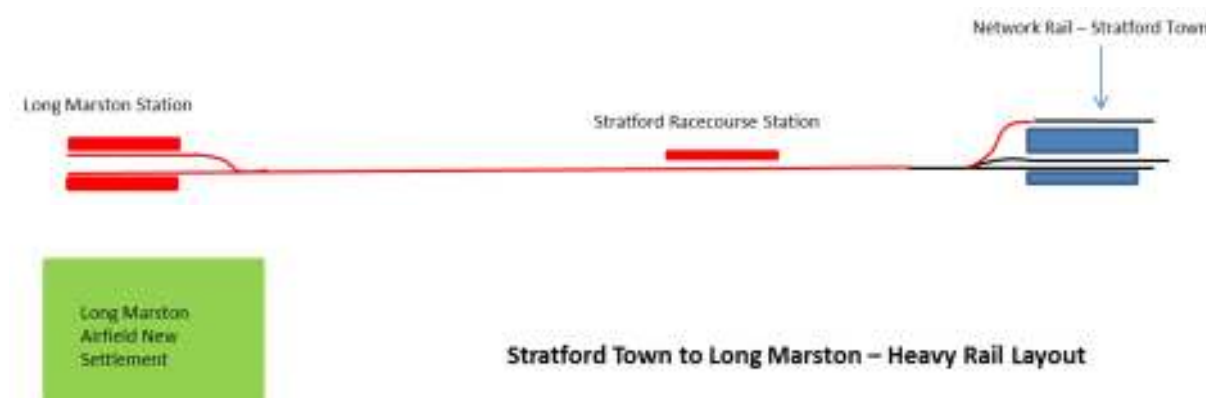
is now operated and maintained by Stagecoach and is branded 'Stagecoach Supertram' Heavy Rail Link. The scheme cost £240m to construct (at 1991 prices)¹⁰.

HEAVY RAIL LINK

7.1 SUMMARY DESCRIPTION OF OPTION

The Arup report 'Stratford to Honeybourne Reinstatement' dated 25 September 2012 has considered a Heavy Rail link from Stratford Town Station to Honeybourne Junction Station following the former alignment of the Heavy Rail link along Summertown Way, Seven Meadows Road and The Greenway. The report recommends that a single track railway is provided which links into Platform 3 at Stratford railway station, with intermediate stops at Stratford Racecourse and Long Marston Station.

It is apparent from the Report that the Office of Rail Regulation (ORR) would not support any application to reinstate a level crossing at Evesham Place, at the southern end of Summertown Way, Stratford. Furthermore, a level crossing would result in significant delays to road traffic which is of particular concern to the highway authority Warwickshire County Council and local residents. The preferred option selected by Arup in their report is therefore to provide a grade separated solution with the proposed railway 'diving under' the existing highway to then join back up with the existing rail network, at grade, at Stratford railway station. The grade separation would commence at the south end of Summertown Way and would take the railway under Seven Meadows Road.



7.2 INFRASTRUCTURE REQUIREMENTS

Stations

The main station on the proposed route would be the existing Stratford railway station and the new service would utilise Platform 3 that is currently serves as a terminus platform for services from Birmingham and London. The single track Heavy Rail alignment would then enter a 'dive under' structure along Summertown Way and reappear again at grade adjacent to Stratford Racecourse where a single face platform station could be constructed to service the racecourse on race days and for other events. The train would then run along the Greenway at grade to a 'parallel face' platform station which would be constructed adjacent to Airfield development. The design of the Long Marston

¹⁰ [www.railway-technology.com](http://www.railway-technology.com/projects/sheffield-tram/). Accessed 13/03/14. Available at: <http://www.railway-technology.com/projects/sheffield-tram/>

station would be future proofed to enable a ‘through connection’ to the mainline at Honeybourne to be made without major re-working of the infrastructure.

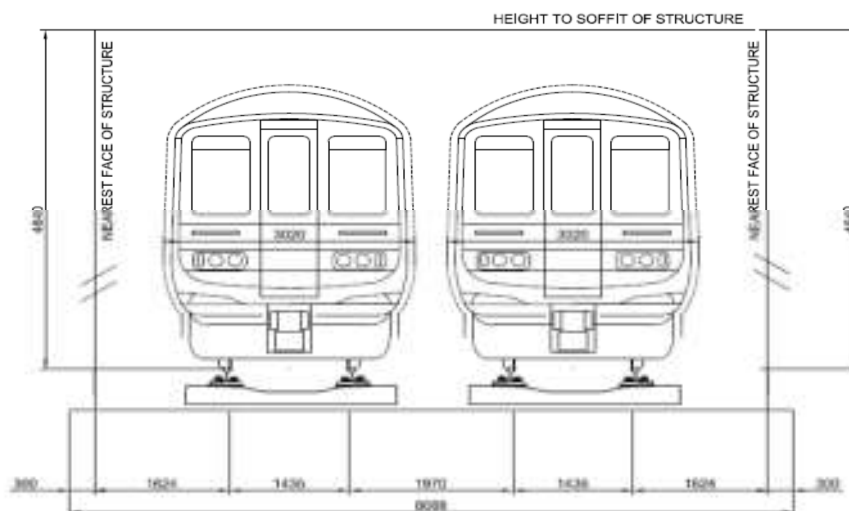
Structures

The requirements for a proposed dive-under structure would result in significant cost and disruption to traffic during the construction of this structure. The River Avon is only 450m from the alignment of the proposed dive-under structure and would be at risk from flooding and would necessitate a requirement for a permanent pumping station to remove water from the invert of the tunnel. Any existing statutory undertaker’s (utility) equipment in the carriageway would need to be diverted to allow for a cut and cover type structure to be built; creating a tunnel for a single track Heavy Rail link from Stratford Town Station to The Greenway. The track would emerge to run at ground level along The Greenway with an option for a new station with a single platform to service Stratford-upon-Avon racecourse on the north side of the corridor, the single track would then continue for approximately 3.75Km to Milcote Road when the track would be doubled to Honeybourne Junction Station.

It is likely that the existing bridge that crosses the River Avon, south of the Racecourse, will need to be replaced to accommodate the Heavy Rail link, but this can only be confirmed following a detailed structure assessment. Consideration will also need to be given to the design of the Milcote Road & Station Road crossings, as again, the ORR would not accept a level crossing in these locations. A road overbridge would likely be required if the road cannot be stopped up; recently this approach was taken to replace the Tile Hill level crossing, in Coventry and a pre-stressed concrete bridge with reinforced soil embankment approaches was used to great effect.

Typical dimensional requirements for a twin track railway is shown below:

Standard Gauge



Therefore, the overall minimum width requirement for a twin track railway on a straight section of track is 8088mm and the minimum corridor width for a single track railway on a straight section of track is 4683mm. However, this does not allow for a cess for safe access to the railway for maintenance which would increase the minimum width to 8840mm for a twin track and 5435mm for a single track.

The route would need to be fenced with palisade fencing to prevent unauthorised access on to the track which could be unacceptable to planners based on the aesthetics of the fencing.

Interface with Honeybourne Junction and Stratford Town Stations

At both ends of the link the existing signalling system will need to be modified to allow for a connection so that rolling stock can be maintained at existing TOC maintenance depots on the Network. This signalling interface could be problematic if the system is outdated with limited capacity to amend without a major upgrade required. Therefore, if a heavy link is to be considered further a full signalling assessment will need to be undertaken.

Potential Enhancements

In addition, rebuilding the southern chord south of Honeybourne Junction Station would allow greater flexibility for through services from the Cotswold Line and allow passengers direct access to Oxford and London Paddington via the recently completed redoubling of 20 miles (32 km) of track from just east of Charlbury to Ascott-under-Wychwood, and from Moreton-in-Marsh to about 1 mile (1.6 km) west of Evesham completed on 22 August 2011.

Arup have also identified through their studies a number of medium and long term train service options. In the medium term, subject to priority pathing requirements of passenger services and the single line constraints, the Stratford to Honeybourne line could accommodate freight trains which would bring wider economic advantages to the scheme business case. In the longer term, based on passenger growth and additional infrastructure investment, there could be a potential new service by linking the existing Gloucestershire and Warwickshire Steam Railway to Cheltenham and Bristol via Broadway and Toddington.

7.3 SERVICE PATTERN & ROUTE CAPACITY

The Arup report has predicted that a new station at Long Marston would generate approximately 30,000 trips per annum and the new rail link up to 460,000 trips, depending on which design option was progressed. SLC have undertaken a comparison of this projected demand against another recently completed station serving a new housing development; Aylesbury Vale Parkway.

A comparison of the characteristics of the two stations is shown below:

Factor	Aylesbury Vale Parkway	Long Marston
Size of development	3,000 dwellings	3,500 dwellings
Proposed Location	Extension of route (north), new passenger railway line (was freight)	Extension of route (south) new passenger railway line (currently Greenway)
Distance from local town	Short – 2 miles	Short – 5 miles
Time to nearest major urban employment area / train service	London – 65 minutes 2tph	Birmingham – 60 minutes 2tph
Projected Station Demand (single trips per annum)	225,000 – 250,000	30,000

Aylesbury Vale Parkway (AVP) was constructed adjacent to the 'Berryfields Major Development Area' which would create 3,000 new dwellings on the outskirts of Aylesbury. As with the Long Marston site the new station was situated at the edge of the development. The Parkway Station was constructed around the point of 30% - 35% of the development being complete.

Between 65% and 70% of the passenger demand at AVP was expected to be to London for employment purposes, given the 65 minute journey time and direct connection, whereas demand from Long Marston would be focussed towards Birmingham and other destinations. However it can be seen that there are many similarities between the two development sites. The one notable difference between the two is that the level of demand projected to be generated by the Airfield development is significantly lower than that of AVP.

The 3,000 houses on the Berryfields MDA were expected to generate between 225,000 and 250,000 single trips per annum at Aylesbury Vale Parkway. This would equate to around 530 round trips per day, or on average around 17.5% of residents (or 1 in 6 households)

Taking the above factors into account and working through a similar set of parameters for a new station at Long Marston, the following indicative demand for the station could be inferred:

- Around 495 trips round trips per day¹¹
- Of these 300 are assumed in the peak periods¹²
- Scaled up this would represent 230,000 single trips per annum; an increase in the market for Stratford of 25%, based on the 2012/13 figures

An increase of 300 peak period trips would drive the need for a minimum of 4 carriage trains in the peak periods to service the demand created. This figure is probably an overstatement of requirements because some full fare ticket passengers would actually travel off peak. This suggests a minimum of an hourly service would be needed to support the demand created. It is recommended that detailed timetable modelling is undertaken using industry recognised software such as 'Railsys' (or equivalent) to establish the optimum service pattern, taking into account demand arising from the new station and existing services / constraints on both the Cotswold Line & the Stratford to Birmingham railway.

A further 15% to 20% of demand could be created from provision of a large car park (≥ 250 spaces) that enables access from surrounding conurbations for passengers who might be 'suppressed' due to existing issues accessing Stratford town station, this may feel like over provision but would reduce the subsidy on the developer (effectively converting revenue to capital costs).

It should be noted that this comparison assessment is a very 'light touch' method of analysis and there is therefore a requirement for further development of the demand numbers before this information is passed to a wider audience. Further development would include the need to move towards a fully 'Passenger Demand Forecast Handbook' created demand model which would enable more in depth modelling to be carried out rather than relying on comparative schemes.

¹¹ 530 return trips per day from AVP x 3500 dwellings at LM / 3000 dwellings at BMDA x 80% penetration

¹² 60% of travel occurs in peak hours

7.4 COSTS

Arup have prepared a high level initial cost estimate for reinstating the Stratford to Honeybourne route which is contained in Section 6 (table 6.1 – Capital Costs) of their report. The estimate is provided at £96.9m (at 2012 prices) and includes an approximate 26% contingency (by value); for the purposes of this study we have relied on costs included within the Arup report. Given the unknowns associated with integrating the new section of line with the existing rail network, the flooding risks associated with the dive-under at Stratford and the need for a potential road crossing at Milcote Lane and / or Station Road we would recommend that consideration is given to further develop the cost estimate taking into account these risks.

7.5 FEASIBILITY OF DELIVERY

The likely build-out rate and thus the speed of development is a fundamental issue to be dealt with on Heavy Rail schemes. As with most development led infrastructure, on Heavy Rail schemes there is a balance to be struck between infrastructure cost and the value obtained; on rail there is the additional burden of the potential need to support operational costs (of the stations and train services) in advance of the time when they become self-supporting.

Experience suggests that the ultimate timing for the arrival of operational railway to support development is at the point the development is around 30% to 35% complete. Based on the information provided within the CALA Homes Vision document, the Heavy Rail scheme would need to be operational by 2023/24 in order to coincide with 30% - 35% of the development being complete.

7.6 OTHER SIMILAR EXAMPLES

In recent years a number of successful Heavy Rail systems have been developed and brought into operation. Examples include:

- **‘BORDERS RAILWAY’** - One similar project is in Scotland where more than 40 years after the closure, some of the Waverley Route is to be revived in the form of the new £300m Borders railway, which, after years of wrangling, is set to be completed by the summer of 2015. The new 30-mile line will run from Waverley station in central Edinburgh as far as Galashiels and then to Tweedbank where there will be a park and ride designed to give access to the network to people from surrounding towns. The Borders Railway Project will deliver a range of benefits to communities along the route including opportunities for social travel, employment and education as access to neighbouring towns, Edinburgh and the wider railway network is provided. A route map is shown below:



- **‘MOOR STREET STATION, BIRMINGHAM’** - The project was the culmination of other work Mott MacDonald had undertaken as part of the regeneration of Moor Street Station since 2001. The objective of the project was to re-open platforms 3 and 4 to passenger trains and to provide a stabling facility for two 8-car trains. The work included structural assessment of 33 masonry arches which form part of Bordesley Viaduct. Included within this work was the design of strengthening measures to eight arches which carry the station platforms and track bed. Other works included the extension of the existing platforms to accommodate 8-car trains, the design of the new permanent way alignment and civil engineering works to support new signalling and telecoms infrastructure.

The project, procured under a Design and Build contract, was funded by Chiltern Railways. The project was completed in time for the additional platforms to be brought into use in time for the December 2010 timetable change.



Reconstructed Wing Yip Bridge (on approach to Moor Street Station), Birmingham



Chiltern Railway Class 170 on approach to Platform 4 – Moor Street Station, Birmingham

COMMON CONSIDERATIONS

8.1 PLANNING

All three options will require a planning application to be developed and submitted to the local planning authority (LPA) prior to any commitment being made to deliver the final scheme. There are two options to obtain the necessary planning consent:

- **Option 1: Full Planning Application** – this would require CALA Homes to develop detailed scheme proposals that would provide sufficient information for a Full Planning Application to be submitted & approved by the LPA. Such an approach would provide all the planning consent needed to deliver the scheme but would require a significant amount of time and resources being invested in scheme development. If, for any reason, the scheme was then not approved by the local planning authority there would be no return on this investment.
- **Option 2: Outline Planning Application** – this option would require the planning application to be determined in two stages and would be achieved through the ‘Outline’ and ‘Reserved Matters’ application mechanism. Such an approach has been used successfully in SLC’s recent experience on major infrastructure projects such as Stratford Parkway Station. The advantage of this option is that once an outline scheme has been developed, CALA Homes can apply for Outline Planning Permission but reserve matters of detailed to the later stage of determination. This approach quickly establishes the planning principle of the scheme, without putting significant levels of resource at risk, and gives confidence to justify more intensive levels of scheme development at a later stage.

We would recommend that Option 2; Outline Planning Application is followed in the delivery of this scheme.

8.2 ECOLOGY

All three options will require detailed ecological surveys to be carried out along the route of the transport link (typically this will be encompassed through a ‘Phase 1 Habitat Survey’). The surveys will be required to identify the presence of any protected species or whether there any sites of notable

biodiversity or ecological importance that need protection. Given the length of time that has passed since the closure of the original Heavy Rail link between Stratford and Honeybourne, and the nature of the route (which passes through countryside with watercourses and includes bridges), it is likely that some protected species are present.

It is important to note that ecological surveys can only be undertaken at certain times of the year as defined by Natural England¹³. Typical key dates are as follows:

- **Phase 1 Habitat Survey:** April – September
- **Bats:** May – September (trees best surveyed in winter period)
- **Great Crested Newts:** March – June
- **Reptiles:** March – June (peak surveys in April & May)

Once Phase 1 Habitat Surveys have been completed, a Protected Species Contingency Plan will be required as part of the planning obligations to identify any mitigation measures required. It is recommended that ecology surveys are undertaken as soon as possible within the development phase of the sustainable transport link to ensure that measures can be adequately accommodated within the delivery and construction phases of the scheme without undue cost or delay.

The ‘Sustainability Appraisal of the Stratford-on-Avon Alternative Strategic Options’ notes that there should be no net loss of biodiversity as a result of the development; the Protected Species Contingency Plan will therefore be required to detail the measures proposed to address any loss.

The Sustainability Appraisal also notes, in Section 4.4.3, that the site is at risk of flooding from local watercourses. This risk also extends to sections of the proposed transport link; the northern section is at risk of flooding from the Avon and the southern section, between Weston on Avon to the Airfield, from local tributaries to the Avon.

At the northern end flooding is a key consideration if the Heavy Rail link is taken forward with a ‘dive under’ through to Stratford railway station. At the southern end of the Greenway, the route is ‘at grade’ with the landscape and in both cases careful thought will be required to include suitable measures of flood mitigation or compensation within the scheme’s design.

8.3 FLOOD RISK ASSESSMENT

Consultation will also be required with the Environment Agency (EA) to agree the acceptability of these designs, which will need to be supported by a detailed Flood Risk Assessment (FRA). Approval to the scheme designs and FRA will be required from the EA at planning stage to avoid any delay to the implementation programme.

8.4 PUBLIC ACCEPTABILITY

Whilst the focus of this report is not on the public or political acceptability of the three transport options, it is worth noting that public opinion will come to bear on the scheme once an option has been selected for development and delivery.

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<http://www.naturalengland.org.uk/ourwork/planningdevelopment/spatialplanning/standingadvice/specieslinks.aspx>

It is likely that a Bus link will carry the most public favour because it is visually the least intrusive option and will require fewer changes to the existing character and highway infrastructure of Stratford.

Light Rail similarly is less visually intrusive and ‘infrastructure intensive’ than the Heavy Rail option. On road trams are often also seen as a modern solution to sustainable transport problems, thanks in part to the success of similar schemes in major UK & European cities. However it should be noted that the central urban area of Stratford has important historical significance and any infrastructure such as overhead line equipment or tram signalling systems will need to be sensitively designed to avoid negative public opinion. This may increase the cost of the option at development stage.

Finally, Heavy Rail is likely to attract the most negative public and political opinion from the Stratford urban area given the need for major civil engineering works to create a ‘dive-under’ from south of Seven Meadows Roundabout to Stratford railway station. The alignment passes through densely populated residential areas and is likely to attract concerns from over noise and disruption, both during the construction and operational phases of the scheme.

It should be noted, however, that vocal support does exist from a number of residents living in Stratford, and the surrounding areas, for a Heavy Rail link between the town and Long Marston (and then onto Honeybourne). Groups such as the Shakespeare Line Promotion Group¹⁴ are actively campaigning for the re-instatement of the rail link in order to achieve better rail connectivity for Stratford, to mitigate against road traffic congestion and to provide increased network resilience.

HIGH LEVEL ASSESSMENT

9.1 ASSESSMENT OF OPTIONS

Following appraisal of the three options for the public transport link between Long Marston and Stratford, a high level assessment is provided below:

MODE	DESIGN REQUIREMENTS	JOURNEY TIME	INTEGRATION	SERVICE OPTIONS / CAPACITY	COST	SUSTAINABILITY / MODAL SHIFT
BUS	Least intrusive option, which can accommodate on-highway running if required. High feasibility of construction.	Slowest option – bus can only run at 55 km/h on the Guided Busway – total 13 minute Journey Time	Easy to integrate with existing transport links / Stratford town centre. Also easy to integrate into heart of housing development. However interchange required for national rail network.	Lowest capacity option per bus but high frequency of service (up to every 5 minutes in peak hours). Limited room for expansion.	Cheapest option both in terms of capital cost of infrastructure and operating costs.	Least sustainable option in terms of promoting modal shift from the private car. Journey time close to that of private car and less flexible.
LIGHT RAIL	Medium level of infrastructure requirement, but easy to construct and maintain.	Medium speed option – tram can run at 70 km/h between Long Marston & Stratford but subject to urban speed limits in Town. Total 10 minute journey time.	Possible to integrate with both existing transport links / Stratford town centre and the housing development.	Medium level of capacity per tram unit, requiring lower frequency of service. Option to increase capacity (frequency) in future.	Medium – high cost option in terms of capital cost of infrastructure and operating costs.	Will attract sustainable modal shift from the private car, but may not be seen by all as a suitable alternative given the risk of congestion in Stratford.
HEAVY RAIL	High level of infrastructure required, with greatest maintenance and operational costs. Hardest to construct.	5 – 10 minute journey time (depending on rolling stock and whether calling pattern includes racecourse halt).	Can be linked directly into the existing heavy rail network in Stratford; thus offering direct services to Birmingham, London and beyond.	High capacity per train unit, requiring lower frequency. Provides wider benefits for freight and network resilience. Future frequency improvements possible.	Highest cost option in terms of capital cost of infrastructure and operating costs.	Most sustainable option in terms of promoting modal shift from private car to rail. Helping to support long term business case / revenue growth.

¹⁴ <http://www.shakespeareline.com/arl.htm>

From the assessment it can be seen that the Heavy Rail option is both the most expensive to deliver & operate and provides less ability to integrate with the heart of the housing development and Stratford town centre. However, it has the potential to provide major benefits in terms of being able to connect directly with the existing mainline stations at Stratford, and thus the national rail network, and the ability of the mode to transport large volumes of passengers in the peak hours. It also provides additional benefits if the line is extended to Honeybourne by increasing accessibility to major conurbations to the south and west of the site, by offering new paths for cross – country freight trains and an alternative route that gives network resilience in case existing rail lines are blocked / operating at capacity. These additional benefits may provide suitable justification for attracting third party contributions from both the private and public sectors.

The Bus option is far less efficient in terms of directly integrating with the existing rail network in Stratford but can be more readily integrated with both the housing development and Stratford town centre. If required, buses can use existing highway network infrastructure, if modified with bus priority measures or bus lanes, when the route reaches the Stratford urban area to avoid the need for expensive measures to segregate the route. The down-side of this is that there is a risk the bus will become delayed by existing congestion on the local highway network if the priority measures have limited impact, and this together with the associated reliability issues could impact on its perception and use. Its passenger carrying capacity per unit is much lower than the train or tram but the service could perceivably operate at up to a 5 minute frequency in peak hours.

Finally the Light Rail option sits between the Bus and Heavy Rail modes in terms of infrastructure requirements, integration and service pattern. Whilst more infrastructure is required than the Bus option, it is less intrusive than the Heavy Rail option and requires much less operational maintenance. It has the ability to carry more passengers per unit than the bus, but less than Heavy Rail, requiring a lower frequency of service and has the possibility of serving both the railway station transport interchange and town centre in Stratford. With careful planning it could also be integrated within the new development, by running ‘on street’ via the settlements central distribution road. The down side of Light Rail is that it is relatively expensive to construct and is therefore only typically implemented in areas or on routes where there are major passenger journey flows.

SELECTING A PREFERRED OPTION

10.1 MATRIX ASSESSMENT

A matrix assessment of the options is provided below; seven key areas have been considered in response to the initial objectives set out by Mode Transport:

MODE	GUIDED BUSWAY	LIGHT RAIL	HEAVY RAIL
DESIGN / DELIVERABILITY	✓✓✓	✓✓	✓
CAPACITY	✓	✓✓	✓✓✓
OPERATIONAL COSTS	✓✓	✓✓	✓✓
SUSTAINABILITY	✓✓	✓✓	✓✓✓
INTEGRATION	✓	✓	✓✓✓
LOCAL ACCESSIBILITY	✓✓✓	✓✓✓	✓
CAPITAL COST	✓✓✓	✓✓	✓

Key: ✓ - Poor
 ✓✓ - Medium
 ✓✓✓ - Good

From the assessment it can be seen that the Guided Busway is both the cheapest option and the most feasible to deliver. It would provide good levels of integration with local services in both Stratford and at the site of the new development. However it does not perform so well in terms of offering convenient integration with the existing public transport links in Stratford, nor to the key service and employment centres to the south and west of the site (such as Worcester / Evesham and Oxford). It is likely to provide sufficient capacity to meet demand arising from the development in the peak periods, but without a full business case assessment it cannot be confirmed that subsidy will not be required to support the services.

The Guided Busway has the potential to be upgraded to a Light Rail system, in response to changes in demand. A key factor in this conversion would be the use of precast concrete track beds that have a future proofed design to facilitate Light Rail use. As a stand-alone option, however, Light Rail makes less commercial sense given size of the initial capital cost and the limitations of integration into wider public transport networks. Whilst the public acceptability and ease of construction is more favourable it would appear more prudent to opt for the Heavy Rail option given the breadth of benefits it offers; accessibility to and from major conurbations to the north, south and west of the development (such as Birmingham, Oxford and Worcester), the capacity to carry large numbers of passengers in comfort and with shorter journey times than other modes and, in the long term, offering the most environmental and commercial sustainability.

There are challenges associated with the delivery of a Heavy Rail scheme, not least the engineering issues associated with providing a connection through to Stratford station. However there are clear benefits in the delivery of the scheme to both the development and the wider public transport network. The comparison assessment of Arup's projected demand for Long Marston Station against that of Aylesbury Vale Parkway suggests that further work is required to provide a robust forecast of demand and to underpin the business case. Schemes like the one delivered at AVP typically attract funding from government or localised public sector sources due to their contribution to the economy at large through widespread reductions in road traffic congestion and contributions towards national climate change and environmental agendas. Central Government funding was given to the AVP scheme to support its development and it seems reasonable to infer that the Heavy Rail link at Long Marston could similarly qualify.

10.2 ASSESSMENT OF STRATFORD-ON-AVON DEVELOPMENT SITE

An assessment of the suitability of the Airfield site to provide significant sustainable transport links to Stratford and the wider, existing, public transport networks has been made. This assessment has been based on a review of the 'Sustainability Appraisal of the Stratford-on-Avon Alternative Strategic Options' report produced by Lepus Consulting in January 2014. It is noted that all options would be required to deliver a robust public transport package to improve sustainability of the development but it would appear that Long Marston is able to deliver such a requirement given its proximity to Stratford and the presence of the safeguarded Greenway corridor.

A summary of the potential for sustainable transport measures is provided below:

SITE	LONG MARSTON
CAPITAL COST	--
CAPACITY	++
OPERATIONAL COSTS	-
SUSTAINABILITY	++
DELIVERABILITY	0
INTEGRATION	++
LOCAL ACCESSIBILITY	++
OVERALL SCORE	++

KEY:

LIKELY STRONG POSITIVE EFFECT ++

LIKELY POSITIVE EFFECT +

NEUTRAL/NO EFFECT 0

LIKELY ADVERSE EFFECT -

LIKELY STRONG ADVERSE EFFECT --

In summary the Long Marston Airfield site offers high potential for the creation of a sustainable public transport link between the development, existing employment and service centres and the wider public transport network. Whilst the link has the potential to deliver high accessibility benefits for the development, it will be expensive and time consuming to implement any of the three options put forward. A robust business case will therefore be required.

CONCLUSIONS

11.1 SUMMARY OF OPTIONS

The option appraisal has shown that all three modes of transport are feasible to deliver, but at different levels of capital investment and complexity of delivery.

- **HEAVY RAIL** – this option is the most expensive and complex to deliver but offers the most benefits in terms of accessibility, sustainability and capacity. Given the findings of the comparison with Aylesbury Vale Parkway it would appear sensible to revisit the business case for the scheme to confirm the commercial viability of the option. It would also appear prudent to assess the appetite for the scheme from key stakeholders in the rail industry and the wider transport community at an early stage.
- **LIGHT RAIL** – if the Heavy Rail option is not affordable then the Light Rail option would offer many of the benefits at reduced cost. However it would not appear prudent to deliver this option if the transport link was to be upgraded to a Heavy Rail line at some point in the future.
- **GUIDED BUSWAY** – this option offers the cheapest solution to provide a sustainable transport link between the new settlement and Stratford. The Guided Busway offers good local accessibility but has very limited capacity to open up the Airfield site to other key conurbations in the sub region and is likely to be hard to justify in terms of commercial viability.