

# Technical Note

|              |  |         |                        |
|--------------|--|---------|------------------------|
| Project:     | <b>Hertfordshire County Council<br/>Transport Planning Contract</b>            | Job No: | <b>60304737</b>        |
| Subject:     | <b>A414 Transport Strategy, Strategic Study – Feasibility Review – Stage 3</b> |         |                        |
| Prepared by: | <b>Anwar Yusuf/Humphrey Hodge</b>  | Date:   | <b>1 December 2014</b> |
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| Approved by: | <b>Ian Burrows</b>   | Date:   | <b>5 December 2014</b> |

## 1. Introduction

- 1.1. Hertfordshire County Council (HCC) is currently considering options for a transport strategy along the A414 corridor through Hertford, between the junction of Hertingfordbury Road/Thieves Lane in the west and the A414/A10 in the east.
- 1.2. The first part of the study focused upon on-line solutions at junctions identified in the Urban Transport Plan and stakeholder workshops. This 'Corridor Study' involved S-Paramics microsimulation model testing of proposed on-line option packages, assessing prospective design options to reduce congestion and delay and to provide additional junction capacity as 'headway' to accommodate planned growth in the short to medium term.
- 1.3. Following this initial work, AECOM were commissioned by HCC to carry out a 'Strategic Study' in parallel with the Corridor Study with both studies complementing each other. The Strategic Study is intended to consider the high level feasibility and costs of prospective alternative, wider solutions which could provide additional corridor capacity and look to alleviate existing and potential future congestion and delay experienced along the A414 within the vicinity of Hertford in the longer term. The 'Strategic' and 'Corridor' studies have been run in parallel and aim to support each other.
- 1.4. Stage 1 involved collating all previous evidence and scheme proposals relevant to the A414 Hertford Corridor. Stage 2 entailed the collection, processing and analysis of ANPR data collected across the corridor to identify the current patterns of vehicle movements.
- 1.5. The purpose of this technical note is to review the schemes identified during the Stage 1 of the study and to determine how these prospective schemes could cater for observed movements identified during Stage 2 and potentially resolve identified problems along the corridor.
- 1.6. This technical note summarises stage 3 of the Strategic Study - the Feasibility Review and will be presented in the following format:
  - Existing traffic patterns observed in Stage 2;
  - Review of public transport improvement schemes;
  - Review of pedestrian and cycle improvement schemes;
  - Review of online schemes; and
  - Review of offline schemes.

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## 2. Existing Problems

- 2.1. Stage 2 of this study, Data Collection and Analysis, identified vehicle movement patterns along the A414 corridor during the peak periods.
- 2.2. To set the context for the purposes of this note, a selection of the key findings identified from Stage 2 are as follows:
  - 20% of all corridor movements passing the ANPR cordon boundary can be classed as external to external 'through' trips.
  - A significant number of vehicles using the A414 are of a strategic nature travelling through the A414 corridor (for example 40% of westbound matched trips in the morning peak);
  - As observed during the corridor modelling and during the ANPR data collection, there is a considerable conflict in movements at Hale Road Roundabout between traffic travelling from east to west on the A414 and vehicles travelling from the west, turning right to employment and education sites on Hale Road;
  - Hagsdell Road and Queens Road are used as an alternative route to avoid the Bluecoats Roundabout in the morning peak;
  - In Bengeo, Bye Street is observed to be used as an alternative route to the A414 during the morning and evening peak.
  - Welwyn Road (B1000) and Ware Road (A119) were identified as significant eastbound and westbound alternative routes running parallel to the A414;
  - Lower Hatfield Road (B158) was also observed as being used as an alternative to the A414 to access the Hale Road employment sites;

## 3. Feasibility Review

- 3.1. The feasibility review considers the previously identified schemes (Stage 1) against the current travel patterns observed along the corridor (Stage 2). Prospective on-line schemes, off-line schemes, public transport and pedestrian/cycling schemes are reviewed in turn against existing travel patterns.

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## Online Schemes

- 3.2. A detailed summary of the Paramics microsimulation modelling undertaken to assess the online option packages was provided in the document 'Junction Testing and Option Packages - results and analysis' (*A414ModelSummaryReport\_V4.pdf, August 2014*). This report suggested that the A414 corridor performance between the A10 and Hale Road can potentially be improved by the combination of previously tested individual junction options. However the potential release of latent demand was likely to lead to pinch-points elsewhere within the corridor under both Package 1 and 2.
- 3.3. Therefore it was considered the additional capacity created by the junction improvement options is likely to be taken up by trips along the corridor which are currently re-routing to avoid existing congestion. Based on the limited scale of additional capacity potentially created along the A414 and considering both current and future year demand, it is felt that the effectiveness of the junction improvement options modelled was unlikely to be sufficient. The identified packages of measures were unlikely to solve the issues identified from the previous stage. The online solutions focussed on increasing the capacity of the current network (within the highway boundary), alongside more efficient traffic control systems to relieve congestion along the A414 in Hertford. Working within the current highway boundary limits the scale to which the online solutions are able to provide additional capacity, meaning key issues, such as the Hale Road roundabout, cannot be dealt with sufficiently unless significant capacity improvements are made.
- 3.4. The findings from the ANPR data collection and analysis confirm the movement patterns underpinning the Paramics model testing undertaken for the Corridor Study. The conflicts identified causing traffic delays along the A414 route are also observed in the ANPR data (31% of vehicles travelling from the west are observed to turn right onto Hale Road).
- 3.5. The model testing considered various online improvements to junctions along the A414 including increasing circulatory capacity, full or part signalisations at roundabouts, converting roundabouts to four arm signalised junctions and dualling sections of the A414 that are currently single carriageways. The testing found some benefits regarding journey times but were forecast to transfer delays elsewhere in the network.

## Offline Schemes

- 3.6. Offline schemes potentially provide the most suitable solutions to the congestion issues identified in the data collection stage. A southern or northern bypass could cater for journeys observed to be travelling through Hertford, with the potential to significantly relieve congestion in the town, by transferring trips to alternative routes. Additionally there could be an opportunity to make use of capacity created on the Hertford section of the A414, potentially providing new sustainable transport infrastructure; this is discussed in more detail later in this note.
- 3.7. A southern bypass based on current travel trends, would potentially serve more journeys than a northern bypass. Not only could a southern bypass serve journeys directly across Hertford but also towards employment and education sites around Hale Road, which was identified in the corridor and strategic studies as an area that attracts a large number of journeys during the morning peak, causing delays and vehicle conflicts at the Hale Road roundabout. East to west travel accounts for 66% of external to external trips from the east (1482 vehicles observed in the morning peak), with west to east travel accounting for 69% (926 vehicles) from the west.

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- 3.8. A northern bypass on the other hand, could potentially prove useful in respect of serving planned development sites to the north of Hertford. Any northern bypass could potentially serve as an alternative route around Hertford, as opposed to through Hertford, potentially relieving the existing high levels of traffic on the A414 corridor and possibly providing capacity for future growth.
- 3.9. It is felt that further options such as a northern relief road, may have a negligible effect on vehicle numbers on the A414, but could be useful in the future if combined with public transport improvements and if a potential link between the two railway stations in Hertford is introduced, particularly if combined with the proposal for Crossrail 2 to connect to the town. The Stage 1 report identified the cost of a northern bypass at approximately £35m to £46m, not taking into account any compulsory purchase orders, and a maximum of a 2 lane road without the need for extensive re-building. Data analysis results from stage two show the road is unlikely to be suitable for addressing the key issues identified, but this would benefit from more detailed model testing.
- 3.10. Extensive infrastructure projects such as flyovers, underpasses or tunnelling could also be considered. However, despite potentially providing significant potential to reduce congestion on the A414 within Hertford, high costs may mean these options are not feasible. High level costing per kilometre of tunnel provision has been estimated in the table below.

**Table 1: Tunnelling Cost Estimates**

| Traffic Lanes | Tunnel cost per metre length |
|---------------|------------------------------|
| Single 2 lane | £0.15Million                 |
| Dual 2 lane   | £0.30Million                 |
| Dual 3 lane   | £0.40Million                 |

- 3.11. These costs are in 2012 prices and allow for project and programme risk, although no allowance for inflation has been made. These high level costs are based on our recent experience working on HA/ DfT Major scheme projects.

*Public Transport Improvements*

- 3.12. There is the potential for public transport improvements to change travel habits within and to/from Hertford. Current service levels are low, and do not provide a viable and convenient alternative to travel by car. A combination of well-run Park and Ride schemes, with bus corridors and improved bus priorities in Hertford could increase patronage and in-turn reduce the number of external to internal and internal to internal car trips. External to Internal trips were recorded as being 41% of observed movements (9,158 movements) during the morning peak, hence there is an opportunity here to reduce this and relieve congestion on the A414 in the centre of Hertford through public transport provision.
- 3.13. These schemes would potentially complement prospective offline highway schemes, capacity released on the A414 could be made available to alternative modes. Increasing the provision and quality of public transport would be expected to reduce trips made by car. It is felt that in their own right public transport schemes are unlikely to relieve congestion to the same degree as alternative offline solutions might provide.

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3.14. As previously discussed, there is the possibility to improve interchange between Hertford North and Hertford East stations by potentially using a Northern Relief Road alignment maximising the benefits of any future extension of Crossrail 2 to Hertford East.

*Pedestrian and Cycle Improvements*

3.15. In parallel with any future offline solution there is an opportunity to improve pedestrian and cycle routes within Hertford. Potential improvements to pedestrian and cycle facilities could encourage use of these alternative modes and remove local, short distance car trips on the A414.

3.16. The data collection highlighted a number of conflicting movements along the A414 at various points such as at Hale Road and Bluecoats. It should be noted that whilst pedestrian and cycle trips are likely to be shorter distance compared to other modes, the data collection exercise did not directly collect this information and did not identify internal movements within Hertford.

3.17. Schemes to re-route these trips and reduce the number of conflicts, could possibly make the A414 a more attractive route for cyclists and pedestrians. For example at Hale Road, as identified, 31% of vehicles from the west turn right conflicting with the major east to west route. In combination with an offline solution, these vehicles could be removed following the implementation high quality pedestrian and cycle schemes.

3.18. Improved, safe access to schools could encourage a switch to cycling and walking, whilst a better cycle path between Ware and Hertford could encourage more users to cycle between the towns as a viable alternative to car use. External to Internal trips from the A119 Ware Road do contribute a high number of vehicles, data analysis suggests that of 1203 vehicles that were captured at the ANPR site on the A119 Ware Road during the morning peak, 448 vehicles were captured again having passed through Hertford. From this it can be inferred the majority of the remaining 755 vehicles have stayed within Hertford, so a scheme to incentivise people to switch from driving to Hertford to alternative modes of transports is likely to be beneficial.

3.19. Additional schemes to consider here could include options to take advantage of the reduced numbers of vehicles on the A414 following the introduction of an offline scheme (as already mentioned for public transport improvements). There is a potential here to reduce the number of lanes on the current A414 alignment and to introduce segregated cycle paths or walkways in parallel. In addition, options such as reducing access to Town Centre streets could be implemented to encourage greater levels of walking and cycling in Hertford thus reducing the number of journeys into the Town Centre by car.

3.20. These improvements have the potential to provide attractive and safe alternatives to those making local trips and further reduce vehicle numbers along the A414.

3.21. More detailed analysis for individual schemes is presented in Table 2.

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**Table 2: Review and Recommendations for proposed schemes**

A - Changes to existing road layout:

| Description   | Review   | Recommendations   |
|---|--|---|
| On-line options previously assessed in the Corridor Study   | <ul style="list-style-type: none"> <li>- Findings of the ANPR data collection are comparable with data collected to inform Paramics modelling of potential online options. Issues such as the conflict at the Hale Road roundabout were observed, benefits for junction packages at one location were modelled to cause delays elsewhere in the network, hence overall improvement to network capacity was found to be limited.</li> </ul> | <ul style="list-style-type: none"> <li>- Potential benefits are countered by resulting problems elsewhere in the network. Limitations within highway boundary to increase capacity along the A414.</li> <li>- Consider offline solutions to increase capacity and reduce traffic volumes using the A414.</li> </ul> |
| Dedicated left-turn lane at Bluecoats Roundabout  | <ul style="list-style-type: none"> <li>- In line with the Paramics modelling, a free flow lane at Bluecoats could reduce delays experienced on the A414 from the A10. Introduction of this layout in Paramics modelling leads to delays on Ware Road westbound.</li> </ul>   |   |
| Signal controlled crossroads at Parliament Square, Hertingfordbury Road, Baldock Street and A414 junctions with the B1197 and Cross Lane. | <ul style="list-style-type: none"> <li>- These options were not considered during the Paramics modelling.</li> </ul>   |   |

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| Description  | Review   | Recommendations  |
|--|--|--|
| <p>Closure of Hertford town centre streets to motorised traffic except buses, cycles, taxis, loading (at specific times) at Market Street/The Wash and Fore Street</p> | <ul style="list-style-type: none"> <li>- Observations suggest relatively low numbers of vehicles are travelling into the town centre during the peak periods as compared to other destinations. Closing town centre streets to motorised traffic is likely to have limited impact on congestion issues on the A414.</li> </ul>   | <ul style="list-style-type: none"> <li>- Solutions such as closing the Town Centre to motorised traffic except for specified vehicles should be used as a complementary measure. It is unlikely to reduce the number of vehicles using the existing A414 by a sufficient number of vehicles, but may provide additional benefits by providing a modal shift.</li> <li>- Similarly the VMS and UTC system using SCOOT could complement larger scale interventions, but are unlikely to resolve delay and congestion problems in isolation.</li> </ul> |
| <p>Variable Message Signs (VMS) for car parking and other congestion issues</p>  | <ul style="list-style-type: none"> <li>- Potential to encourage further rat-running.</li> <li>- No other real alternatives to the A414 during peak hours.</li> </ul>   |  |
| <p>Urban Traffic Control (UTC) system using SCOOT to signalise and link roundabouts on the A414 Hertford section</p>   | <ul style="list-style-type: none"> <li>- An efficient traffic control system has the ability to reduce congestion and conflict issues caused by certain roundabouts along the A414 but ultimately the improvements are limited to the actual capacity of the A414 itself, discussion with HCC suggests that signals have been recently optimised, recent operational modelling suggests there is little room for growth along the corridor.</li> </ul> |  |

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| Description   | Review   | Recommendations   |
|---|--|---|
| <p>A119 Ware Road, Hertford junction improvements (IURS)<br/>Upgrade / Increase Capacity of Ware Road</p> | <ul style="list-style-type: none"> <li>- Could potentially encourage more cars to use this route and potentially add to delays along the route towards Hale Road, with the possibility to create further conflicts with vehicles on the A414</li> </ul>  | <ul style="list-style-type: none"> <li>- The A119 Ware Road improvements, along with the B1000/A119 North Road improvements ultimately could increase the capacity of the routes loading onto the A414, further adding to the delays along the A414. With the limited scope for improvements on the A414, these options are unlikely resolve capacity issues.</li> </ul>                |
| <p>Upgrade / Increase Capacity of Lower Hatfield Road</p>   | <ul style="list-style-type: none"> <li>- Lower Hatfield Road capacity increase could be a more attractive option for vehicles travelling towards the Hale Road employment and education sites. Already well utilised from the west, but can be better used as a route to remove vehicles from the A414</li> </ul>  | <ul style="list-style-type: none"> <li>- The increase in capacity of Lower Hatfield Road is an alternative option to consider. It is currently well used by vehicles looking to access the Hale Road employment and education sites, and an increase in the capacity could attract more vehicles to use this route, removing journeys on the A414 from the west of Hertford.</li> </ul> |
| <p>Upgrade / Increase Capacity of North Road and B1000</p>  | <ul style="list-style-type: none"> <li>- An increase in capacity of North Road and the B1000 could lead to increased traffic volumes entering the A414 at Cross Lane roundabout creating further conflicts, congestion and delays. Already there is a conflict in traffic from this direction turning right at the Hale Road roundabout, and this could further add to the problem.</li> </ul> |   |

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B - Major new road construction:

| Description  | Review   | Recommendations  |
|--|--|--|
| Rowley Link Road   | <ul style="list-style-type: none"> <li>- Rowley Link Road is unlikely to have any impact on the observed A414 capacity issues.</li> </ul>  | <ul style="list-style-type: none"> <li>- This option should only be considered if it is combined with Northern by-pass option</li> </ul>   |
| A414 bypass to the south of Hertford (Rush Green Link to Cole Green By-pass) | <ul style="list-style-type: none"> <li>- Has the potential to significantly reduce the number of vehicles using the A414 - 40% of vehicles from the A10 Junction at Rush Green were observed travelling through Hertford and continuing along the A414. A new access to the Hale Road employment/ education sites would have the potential to remove vehicles from the A414 westbound and eastbound direction, potentially further easing congestion.</li> </ul> | <ul style="list-style-type: none"> <li>- Further, detailed assessment and strategic modelling of this option is recommended to assess the alternative east-west route through the A414 Corridor.</li> </ul>  |
| Northern Relief Road   | <ul style="list-style-type: none"> <li>- Current traffic flows suggest this option is unlikely to cater for a significant amount of vehicles as an alternative to the A414.</li> <li>- Potential to become a transport link connecting the railway stations in light of proposals for Crossrail 2 to serve Hertford East.</li> </ul>   | <ul style="list-style-type: none"> <li>- Unlikely to significantly impact on the vehicle levels on the A414 therefore unlikely to resolve current capacity issues.</li> <li>- Potential to improve interchange between Hertford stations.</li> <li>- Suggest detailed assessment and strategic modelling.</li> </ul> |

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| Description  | Review  | Recommendations   |
|--|---|---|
| <p>New alignment to Northern By-pass to connect with proposed developments to the west and north of the town e.g. linking B1000, North Road and the A10/A602</p> | <ul style="list-style-type: none"> <li>- As with the southern bypass option, this route has the potential to remove a high number of vehicles travelling east-west through Hertford. Will not serve journeys towards the Hale Road employment/ education sites to the south of Hertford, so these vehicles will remain on the network.</li> <li>- External to External trips between the north and east of Hertford, are relatively low (at 15% of 764 from the north, and 5% of 2248 from the east during the morning peak) compared with other movements, but still could remove these vehicles from the A414, freeing up capacity.</li> <li>- Due to the length of the route, the less congested A414 could attract vehicles back as a quicker route across Hertford; along with vehicles previously rat running.</li> </ul> | <ul style="list-style-type: none"> <li>- As with the southern bypass this option could cater for a high number of vehicles and trips made. Routes would include from, East to North, East to B1000, North to West and vice-versa, (approximately 1660 vehicles observed in the morning peak). Should be considered as an option for more detailed assessment and strategic modelling.</li> <li>- Would be important to combine this option with further schemes to discourage users from using the A414 for through trips.</li> <li>- Would potentially attract more vehicles if alignment extends back to the A414 in the West.</li> </ul> |

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| Description   | Review  | Recommendations   |
|---|---|---|
| Add additional lanes to the A414 Hertingfordbury Road   | <ul style="list-style-type: none"> <li>- Adding additional lanes at the A414 Hertingfordbury Road, could compound problems further along the A414 route.</li> </ul>   | <ul style="list-style-type: none"> <li>- Unlikely to provide relief for identified problems on the A414, mainly the Hale Road roundabout, and in fact potentially encourage more routes through the A414, worsening the conflict of movement at this location.</li> </ul> |
| Flyovers and underpasses at Hale Road and Bluecoats roundabouts<br>Demolition of either the Hertford Telephone Exchange or Stag House to allow significant improvements to the Bluecoats roundabout | <ul style="list-style-type: none"> <li>- Tunnelling, flyovers and underpasses, could address east-west travel and conflicts at Hale Road and Bluecoats roundabouts.</li> </ul>  | <ul style="list-style-type: none"> <li>- Excessive costs and extensive closures required to carry out such work put the suitability of the schemes into question.</li> </ul>  |
| Tunnelling (cut and cover or wider route)   | <ul style="list-style-type: none"> <li>- Demolition of the Telephone Exchange or Stag House, alongside other potential Bluecoats roundabout improvements, may be limited in what could be achieved due to identified congestion issues further along the A414, such as at Hale Road.</li> </ul> |   |

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C - Pedestrian and cycle improvements:

| Description  | Review   | Recommendations  |
|--|--|--|
| Improved crossing facilities on A414; focussing on the Foxhole Estate and Waterways                          | <ul style="list-style-type: none"> <li>- The pedestrian and cycle improvements identified should be implemented in conjunction with highway options</li> <li>- The prospect of reduced vehicle numbers following highway interventions, mean the A414 route could be revised to allow for safe cycle routes for example.</li> <li>- Improving pedestrian walkways, including the underpasses along the A414 could potentially encourage more users.</li> </ul> | <ul style="list-style-type: none"> <li>- These options should be considered as complementary schemes to any proposed highway interventions to further enhance the local area and provide alternative modes of transport such as cycling and walking for local residents.</li> <li>- Potential benefit of reduced internal to internal trips, whilst as mentioned in the offline solutions, a reduced capacity along the current A414 may encourage users to use an alternative route around Hertford.</li> <li>- Off-line solutions have the potential to free up space on the A414 in Hertford which could be utilised for new pedestrian and cycle routes</li> </ul> |
| New town cycle/pedestrian routes (linking Hertford Town Centre / Mead Lane and Bengoe – UTP Routes 7 and 18) |  |  |
| Improved access to schools, pedestrian routes and signing  |  |  |
| Extension of cycle route from Cole Green Way to Hertford North Station (route 1 in Urban Transport Plan)     |  |  |
| Cycle and pedestrian route linking Bramfield Road, North Road, Hertford North Station and Hertingfordbury    |  |  |
| Hertford to Ware via river path  |  |  |
| Extension of cycle route from Cole Green Way to Town Centre and Ware   |  |  |
| Implementation of more schemes in the pedestrian network   |  |  |
| Investigation of additional footpath links   |  |  |
| Town wide cycle rental scheme  |  |  |

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## D - Public transport solutions:

| Description  | Review  | Recommendations  |
|--|---|--|
| Improved east-west links outside the town  | <ul style="list-style-type: none"> <li>- Current east-west links have been identified as under provided, with little alternative but to drive through Hertford. 2206 vehicles were observed make the journey through Hertford, for which an east-west link could potentially provide an alternative.</li> <li>- Park and Ride facilities could reduce the numbers of external to internal trips into Hertford. Currently a high number of external to internal trips (9158 and 8414 vehicles in morning and evening peaks respectively), Park and Ride could ease congestion into Hertford.</li> <li>- Quality Bus corridors would again provide a good alternative to driving into Hertford and further reduce these journeys currently made by car.</li> <li>- Employment and education sites around Hale Road have been identified; more direct bus services into this area could encourage drivers to change their mode of travel.</li> </ul> | <ul style="list-style-type: none"> <li>- Changing transport habits may prove difficult, whilst any reduction of vehicles on the A414 may be taken-up again through drivers diverting back to the A414 from alternative routes. Would need to be pursued in combination with alternative schemes.</li> <li>- Potential to remove external to internal trips.</li> <li>- Off-line solution will open up released capacity on the A414 in Hertford which could be utilised for new public transport routes</li> </ul> |
| Promote Hertfordshire Better Bus – a new service between Watford and Stansted Airport (UTP)  |   |  |
| Hertford Bus Station improvements (UTP)  |   |  |
| Park & Ride facility (including interchange for school bus and coach services) between Ware and Hertford, including bus priority (UTP) |   |  |
| Hertford North Station improvements, bus interchange (UTP)   |   |  |
| Hertford East Station improvements, bus interchange (UTP)  |   |  |
| A119 North Road / B1000 Welwyn Road Quality Bus Corridor (UTP)   |   |  |
| A119 Quality Bus Corridor between Hertford and Ware including bus lane and priority gate on Ware Road (UTP)                            |   |  |
| Area Wide – Real Time Passenger Information System (UTP)   |   |  |
| More direct service of bus routes to County Hall (UTP)   |   |  |
| Improved Bus Priority – area wide (UTP)  |   |  |

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| Description  | Review     | Recommendations |
|--|------------|-----------------|
| 30mph speed limit past the multi-storey car park including County Hall roundabout          | - As above | - As above      |
| Parking review and strategy to discourage long stay parking, linked to Park and Ride (UTP) |            |                 |

.E - Marketing and information:

| Description  | Review   | Recommendations                                    |
|--|--|--|
| TravelWise information to encourage changes to non-car use | - Limited impact on congestion on as standalone schemes. | - Use in combination with other potential schemes. |
| Encouragement of employers to develop commuter plans       |  |  |
| Develop passenger transport info systems                   |  |  |
| Hertfordshire Council Staff Travel Plan                    |  |  |
| Extension of BigHerts Big Ideas LSTF programme             |  |  |

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## 4. Conclusions, Recommendations and Next Steps

- 4.1. The feasibility review has identified a number of possible solutions for reducing congestion and delays along the A414 corridor within Hertford. These have been grouped into 'Online' and 'Offline' road improvements and Public Transport, Pedestrian and Cycling improvements. These have been summarised in the preceding text and are discussed in Table 2. Indeed, there may be combined packages of sub-options which may merit further investigation and analysis.
- 4.2. This process has identified offline solutions as providing the greatest potential in reducing delays and congestion along the A414 corridor. In addition Public Transport, Pedestrian and Cycle improvements could be introduced in parallel to complement the benefits of any potential offline scheme.
- 4.3. The review provides an initial outline of different scheme options. There is however no certainty that these schemes would be the right solution to the existing problems, or indeed considering planned growth aspirations and the additional pressures this may bring. The review provides a basis for HCC to discuss initial thoughts and schemes with other stakeholders.
- 4.4. This review also highlights the need for a strategic modelling evidence base to be developed to provide a greater understanding of the prospective impact, performance and economic feasibility of the schemes discussed. It is noted no such model exists for Hertford although one has been developed which incorporates Welwyn Hatfield, Stevenage and Hitchin. AECOM understands that Hertfordshire County Council are currently considering the possibility of developing a countywide model which would provide a greater understanding on the distribution of trips throughout the county possibly including Public Transport use. As such this would be a valuable tool to assess the prospective schemes, possibly identify alternatives or hybrids, but would also allow sifting to take place.
- 4.5. The next stage of the Strategic Study is Stage 4 'Options Consolidation' which will aim to:
  - To include high level summary of planning, design and build cost of identified prospective schemes;
  - Build upon discussion/knowledge gained in stages 1, 2 and 3 to determine potential traffic impacts of prospective schemes and identify a package of measures to be investigated further;
  - Provide high level costs, qualitatively summarising economic viability; and
  - Provide an economic commentary and qualitative appraisal of prospective schemes, which in turn could form a shortlist worth considering further.