Elstree Way Corridor
Primary Report

July 2014

Elstree Way Corridor - Primary Report

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1 Introduction

AECOM has prepared a design proposal and associated cost estimate for transport and accessibility improvements to Elstree Way Corridor (EWC) on behalf of Hertsmere Borough Council (HBC) and Hertfordshire County Council (HCC). The proposed scheme seeks to achieve improvements for all users with a focus on encouraging use of sustainable modes through removal of existing barriers and better integrating EWC with the locality.

Elstree and Borehamwood Transport Study (2010) identified a preferred option for the corridor that was used as a basis for AECOM's further scheme development. The design development and assessment undertaken by AECOM has resulted in the emergence of a scheme to be taken forward. This document describes the current characteristics and issues of Elstree Way Corridor, key features of the scheme and how this addresses the issues and is compatible with the HBC's Area Action Plan (AAP).

Elstree Way Corridor Area Action Plan (AAP) is a spatial strategy for the coordination of development and design of the EWC, its overall objectives are:

- Provide improved and coordinated facilities for the delivery of a range of services to the public;
- Improve the physical appearance of this important gateway into the town;
- Link the commercial area of Borehamwood with the town centre;
- Provide certainty and guidance to both landowners and developers; and,
- Promote sustainable travel.

The purpose of the AAP is to establish the basis for shaping the redevelopment of the area and to ensure that the wider public realm and highways improvements come forward. Proposals are framed to respond to the needs of existing and future communities and plan for housing growth to 2027.

The redevelopment of EWC aims to deliver over 800 residential units and provide a range of community and cultural facilities for Borehamwood which will contribute to meeting the needs of the wider community. Connecting Borehamwood, improving public realm and permeability are all proposed to attract people and businesses to the area and encourage sustainable development for the wider community.

1.1 Report Structure

An outline report structure is detailed below:

- **Section 2** of this report introduces the background to the scheme and key objectives to be met.
- **Section 3** summaries the existing characteristics of the corridor, describing the features and operation of different elements of the current layout.
- **Section 4** provides an overview of the proposed scheme and points to the design drawing for the proposed layout.
- **Section 5** gives a commentary of the modelling task that has been undertaken as part of this scheme.
- **Section 6** sets out budgetary scheme costings and a recommended construction phasing.
- **Section 7** suggests a phasing programme for implementation to enable the most efficient construction.

Figure 1: Elstree Way

Google Earth Pro™ imagery in the form of Google Map™ and Google Streetview™ have been used, unmodified, within this document. This imagery has been used within the extents of the AECOM license agreement with Google Inc.

2 Scheme Background

A traffic modelling assessment of the wider Borehamwood area was undertaken by Colin Buchanan in 2010. This examined proposals for road network improvements in the area and master plan proposals for the upgrade of EWC. Proposals for shared space and signalised junctions along the EWC were tested. Option testing also included committed and planned residential developments in future years and its associated generated traffic.

The preferred option from the study (Option 2B) included signalisation of both the Tesco and Shenley Road roundabouts. This resulted in reduced rat-running compared to other options. It should be noted that all modelled options contained a link road between Shenley Road (E) and Maxwell Road, and a left turn ban from Shenley Road to Brook Road. HBC requested that the link road was not considered as part of the EWC scheme and, therefore, is not included in this study.

The planned redevelopment of the Elstree Way Corridor provides an opportunity to deliver a significant proportion of Hertsmere's housing requirement over the next 15 years, in an area with many underused or disused buildings and within walking and cycling distance of the town centre. Lower, minimum parking requirements were set for the Elstree Way Corridor area reflecting the additional public transport accessibility of sites within the corridor and proximity to the town centre.

The Corridor is already located within Accessibility Zone 3 as set out in the Council's Parking Standards SPD. The Area Action Plan states that if new or extended Controlled Parking Zones are introduced into roads adjoining the EWC, parking permits are unlikely to be issued to occupiers of sites developed within the EWC. As such, the Plan clearly seeks a modal shift away from the car.

The study area for the scheme developed by AECOM extends from the eastern edge of Borehamwood Town Centre at the Tesco roundabout on Shenley Road to the double roundabout at Elstree Way / Studio Way, bounding the Elstree Way Employment area in the east. This also includes the Shenley roundabout, which links with Brook Road and Shenley Road to the north. **Figure 2** shows the Elstree Way Corridor in relation to the study extents.

The A5135 Elstree Way is an important corridor linking Borehamwood commercial and residential area in the east and Borehamwood transport links in the west. The EWC is the main access to the centre of Borehamwood from the A1(M). Elstree and Borehamwood railway station has over 3 million annual entry and exit trips and movement to and from this station is important for commuters to and from London. As bus interchange is located outside the station.

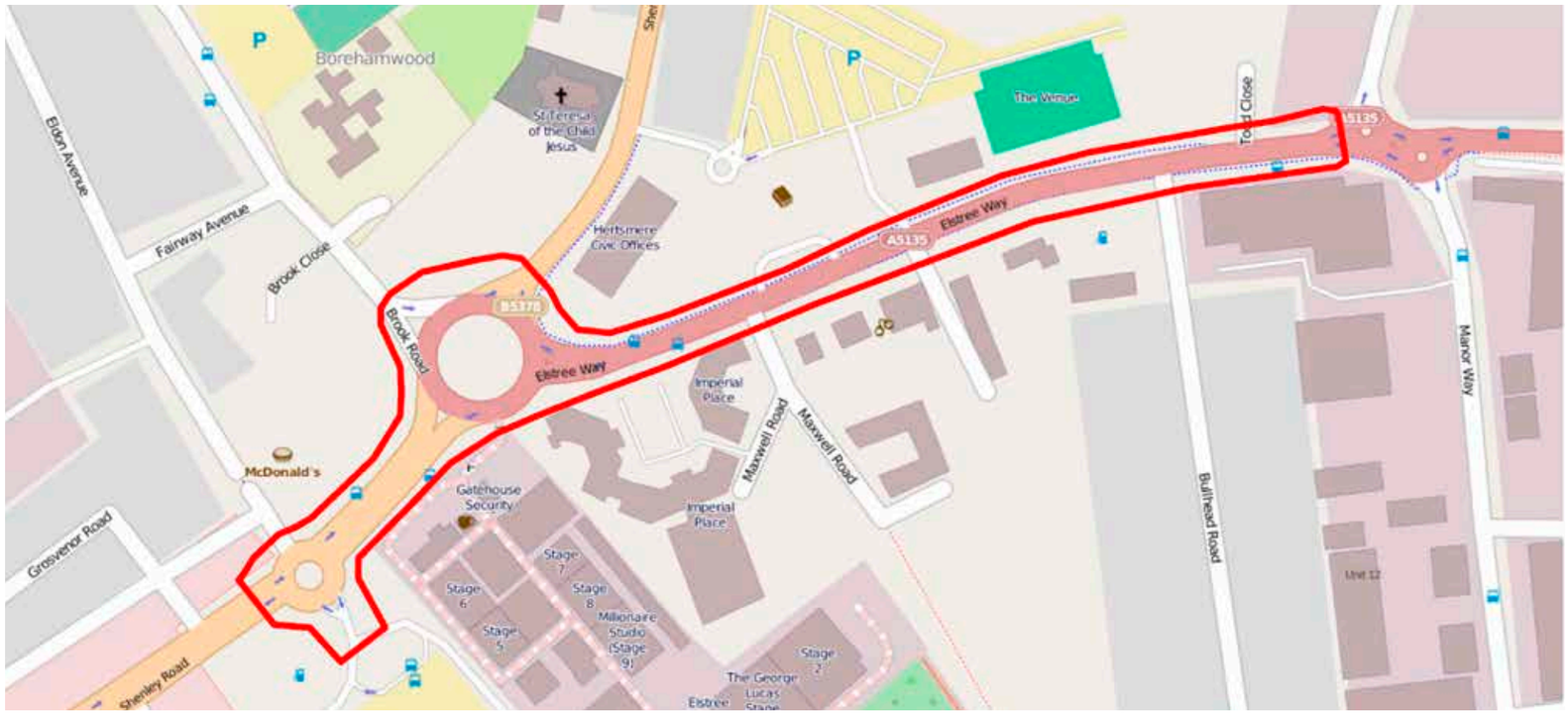
The current layout between the Elstree Way / Eldon Avenue (Tesco) roundabout and the double roundabout at Elstree Way / Studio Way is heavily prioritised towards motorised traffic due to the lack of traffic calming and pedestrian crossings. The environment is unpleasant for walking and cycling users because the lack of controlled crossing points combined with the high traffic speeds. This creates a hostile environment and crossing the carriageway currently a difficult task for pedestrians and cyclists, particularly at roundabouts.

AECOM have explored various options to improve Elstree Way Corridor that fit with the key objectives set out in the AAP, as described in the introduction. The development of the scheme is broadly based on these as well as additional objectives stated in Policy EWC5: Transport and Accessibility (see Table 3 in Section 4).

To ensure an adequate scheme is proposed, the principles of the Roads in Hertfordshire Highway Design Guide (RiH) have been referenced during design development. The guide seeks to 'achieve streetscapes which incorporate the ideals of sustainability and integrated transport' along with the following objectives:

- Applying a user hierarchy to the design process with pedestrians as the number 1 priority.
- Creating networks of streets that provide permeability and connectivity to main destinations and a choice of routes
- Emphasising a collaborative approach to the delivery and sustainability of streets
- Designing to keep vehicle speeds at or below 20mph on residential streets unless there are overriding reasons for accepting higher speeds.

Figure 2: Elstree Way Corridor Study Area



3 Existing Characteristics

3.1 Existing development on EWC

Various property types are situated on Elstree Way Corridor, all of which require vehicular access.

On the south side of the Elstree Way carriageway there are large vehicle crossovers to the Petrol Station, Fire Station, former Police Station and office buildings, along with side roads leading to residential areas and further businesses.

On the north side of Elstree Way there are access roads to parking for the Civic Centre, the main access for the Ibis Hotel and Borehamwood leisure centre. Todd Close is a residential side road.

A large entrance to Elstree Studios is situated on Shenley Road roundabout. The southern arm of Tesco roundabout provides the sole access to the Tesco superstore, as well as a small bus station.

3.2 Current Carriageway Layout

The existing carriageway layout consists of a single traffic lane in each direction with central hatched markings between Studio Way and Shenley Road. The carriageway typically measures 8.5m width from kerb face to kerb face. Between Shenley Road roundabout and the Tesco roundabout, there are two lanes of traffic, each direction divided by a central reservation.

Shenley Road roundabout itself is a busy, large roundabout with two lanes of circulatory traffic and four approach arms. The Tesco roundabout is a smaller roundabout, although equally as busy with the southern arm providing the sole access to Tesco.

The speed limit is 30mph throughout the EWC, however, perceived vehicle speeds are often higher than this, especially on Elstree Way due to the road being fairly open with a lack of traffic calming. West of the study area, Shenley Road is very different in character and is traffic calmed with retail frontages and adjacent service roads

The EWC is congested during peak traffic periods, due to the two roundabouts impacting the flow of traffic. The short links between the two roundabouts and volume of traffic create irregular vehicle flow.

The overall condition of the carriageway is poor with a number of reinstatements following utility repair works. This has resulted in trenching as well as large surface cracks reflecting through the construction layers. Parts of Shenley Road roundabout have structurally failed posing a safety threat to various road users.

3.3 Pedestrian Facilities

EWC is dominated by motorised traffic with a lack of crossing opportunities resulting in severance and poor permeability between the residential and commercial area located on the frontages and to the north and south.

Current provision for pedestrians along the EWC consists of footways that are generally less than 2m wide and are in a poor state of repair. Most bituminous footways are extremely uneven under foot due to structural failure and poor reinstatement of utility works, as illustrated in Figure 2. Large surface cracks also feature heavily. In some places areas of ponding have occurred in the centre of the footways making it difficult for pedestrians to get past without having to walk in to the line of cyclist or stepping on to the grass. All of these issues contribute to an uncomfortable environment for pedestrians.

Figure 3 – Poor cycle and pedestrian facility, poor sight lines for cyclists when entering the carriageway and poor existing footway and carriageway surface.

The pedestrian facilities between Shenley Road and Tesco roundabout are paved and are generally in better condition. However, there are some areas of unevenness.

There are a large number of private accesses with crossovers on Elstree Way which result in a lack of continuity for pedestrians and frequent level changes to be navigated. These crossing points do not meet the requirements set out in the “Guidance of the use of tactile paving surfaces”; and this is mainly due to the incorrect installation of, and / or, the absence of tactile paving (see Figure 3). The lack of tactile paving provision could inhibit pedestrian movements, particularly for the visually impaired. It has also been noted that some of the crossings have low spots in front of the dropped kerbs causing the crossing point to pond, creating a problem for pedestrians trying to comfortably cross the road or accesses.

The subway at Bullhead Road is in need of maintenance and creates an intimidating and unpleasant environment (see Figure 4). It appears to be rarely used with pedestrians preferring to use the uncontrolled crossing at surface level.

Shenley Road roundabout is very difficult to negotiate for pedestrians. Crossing provision requires a significant deviation from desire lines and approaching traffic speeds can be high and intimidating for pedestrians. It can take a considerable time for an adequate gap in which to cross to appear.

The overall streetscape of the EWC is poor with areas in a poor state of repair and looking run down. Existing vegetation on parts of Elstree Way is overgrown, resulting footways that feel secluded, especially at night. Whilst this is recognised as a maintenance issue, the pedestrian environment is affected because of the poor quality of streetscape.

Figure 4 – Lack of tactile paving and dropped kerb facility at wide mouth of Elstree Way/Maxwell Road junction.

Figure 5 – Unattractive and uninviting existing pedestrian subway under Elstree Way (close to its junction with Bullhead Road) with lack of cyclist provision.

3.4 Cycle Facilities

The existing cycle facilities along the EWC are generally narrow, uneven and in poor condition throughout. Off carriageway cycle tracks are provided, however, these are less than 1.5m wide and so do not promote safe two-way, off-carriageway cycling. The attractiveness of the cycle routes is poor and a combination of worn surfacing treatments and faded road markings make the cycle tracks unclear and confusing to both pedestrians and cyclists.

There are a high number of utility covers in both the cycle lanes and tracks, many of the covers are lacking an infill surface and can become extremely slippery when wet (see Figure 5). Large surface cracks are common throughout the pavement of the EWC creating uncomfortable conditions for cycling.

Elstree Way has a high number of accesses to private properties which impact upon continuity of the cycle route. As a result of this, there is poor horizontal alignment and cyclists do not receive priority over motorised traffic.

Currently substandard on-carriageway cycle lanes are provided on Shenley Road roundabout. The current layout requires circulating cyclists to cross turning traffic that is exiting the roundabout as the cycle lane is positioned in the nearside. Cyclists are not encouraged to adopt the primary position through the roundabout and this can cause conflict with vehicles and other road users.

The EWC currently has no formal crossing points for cyclists and poor design layout can lead to potential conflicts with various road users and severance of desire lines (see Figure 6).

Figure 6 – Uneven surface with lack of coloured in-fill on existing cycle tracks.

Figure 7 – An example of poor alignment for cycle movements at Elstree Way/ Shenley Road roundabout.

3.5 Buses and Bus Stops

There are no measures for bus priority present along EWC. There are five bus stops along the study area. Three of the stops are located in lay-bys, which can result in delays for buses trying to re-join the main carriageway, adding to journey times (especially in peak periods). The existing bus lay-by located on the westbound carriageway, just east of Bullhead Road, is constructed from concrete and is in poor state of repair (see Figure 7). The concrete construction creates an ongoing maintenance issue which can be avoided by using a more flexible material.

The existing bus stop situated on the south-western side of Shenley Road is not currently DDA compliant due to kerb heights. This could cause accessibility problems for disabled users waiting to board and disembark buses at this location (see Figure 8). Overall bus stop layouts could be improved to meet the latest accessibility guidelines.

Figure 8 – Existing bus stop on Elstree Way (close to its junction with Studio Way) with poorly maintained concrete surfacing.

Figure 9 – Non Equality Act compliant bus stop, which also results in delay for buses rejoining traffic.

3.6 Collision Analysis

A collision analysis of the study area has been undertaken using collision statistics for the previous five years (2007 to 2012) on the study link. During this period, thirty seven collisions were recorded within the area. Four resulted in serious injury (10.8%), with the remaining thirty three (80.2%) resulting in slight injuries. All four serious collisions involved conflict with a pedestrian. At least one car was involved in each collision hence 100% incidence of cars in each collision statistic. In total, almost half of all collisions within the study area involved either a cyclist or a pedestrian. Collision clusters were identified at the Tesco roundabout and the Brook Road link with the Elstree roundabout.

In summary, the area has a significant number of pedestrian / cyclist related collisions with three serious injury collisions occurring in the past twelve months. Table 1 compares the current EWC collision rate percentages and data from Levels of Collision Risk in Greater London (TfL, April 2012). This report details the levels of collision rate per mode of travel for each borough. Whilst Borehamwood lies outside the Greater London area, the boroughs of Harrow and Barnet are located to the south east of Borehamwood and have similar traffic and transport environments.

Table 1 – Collision comparison

	Location			
Mode	EWC	Harrow	Barnet	Greater London
Pedestrians	32.4%	22.5%	19.4%	21.8%
Cyclists	13.5%	7.1%	5.9%	15.4%
Motorcycles	2.7%	11.4%	14%	20.1%
Cars	100%	91.9%	89.3%	78.7%

Table 1 summarises that the Elstree Way Corridor has a higher proportion of collisions involving pedestrians and cyclists than the nearby boroughs of Barnet and Harrow. The report estimates that the true economic cost of a slight injury in London is £20,245 and £196,589 for a serious (both on built-up roads). Given that three serious collisions have occurred along the EWC since the beginning of 2012, a cost approaching £600,000 to the local area could be attributed to these as a result of the conflict. The use of remedial measures to improve safety for cyclists and pedestrians could offer a long economic benefit.

3.7 Summary

The review of the existing facilities and operation for all users identified a number of key issues to be addressed as part of the AAP and this scheme. These issues are referenced in Table 2 and are discussed in Section 4 where they are assessed in terms of the overall objectives of the AAP and solutions proposed from the preferred scheme.

Table 2 – Existing Issues along Elstree Way Corridor

Existing Issues
Indirect pedestrian and cyclist routings, off of desire lines between town centre and Elstree Way
Narrow, uneven footways and cycle tracks causing conflicts between users
Narrow cycle tracks do not promote two-way cycling
Buses delayed rejoining traffic at stops with lay-bys
Poor on carriageway cycle provision at roundabout
Poor permeability for cyclists and pedestrians within/ across the corridor, lack for controlled crossings
Poor public realm
Disused and unpleasant subway
Numerous crossovers and private accesses

4 Proposed Scheme

4.1 Overview

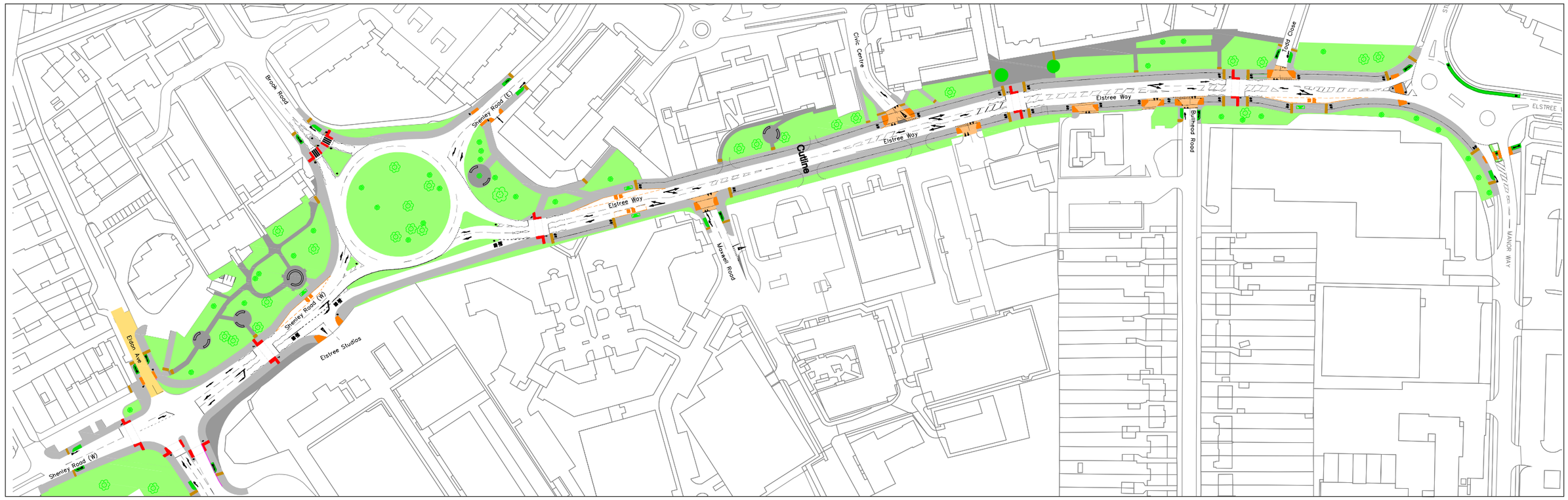
Following extensive design development, traffic modelling and liaison with Hertsmere Borough Council (HBC) and Hertfordshire County Council (HCC) a preferred scheme was agreed. This comprises:

- Widening of existing footways along both Shenley Road and Elstree Way, creating 4m wide shared use footways on both sides of Shenley Road and around Elstree Way roundabout and a 5m wide segregated facility (3m two-way cycle track, 2m footway) on both sides of Elstree.
- The removal of Tesco (Shenley Road/ Eldon Avenue) roundabout and signalisation of the junction including controlled crossing facilities for pedestrians and cyclists.
- Shenley Road(W) - removal of uncontrolled crossings and installation of one toucan crossing in their place.
- Elstree Way/ Shenley Road roundabout – uncontrolled crossing on Brook Road modified with a zebra crossing and a central refuge provided.
- Bus Lane from Elstree Way to Shenley Road, bypassing the roundabout to introduce bus priority associated relocation of the Elstree Studios access away from roundabout.
- Potential closure of four private accesses on Elstree Way (subject to developer proposals).
- Installation of raised entry treatments at all retained private accesses on Elstree Way.
- Removal of one pelican crossing and one uncontrolled crossing, crossing over Elstree Way and the installation of three toucan crossings (in total) in their place.
- Removal of one bus stop on Shenley Road (W) and possible relocation of one stop to maintain spacing.
- Improvements to bus stop accessibility throughout, and investigation of removing all bus lay-bys.
- Relocation of the westbound bus stop on Elstree Way just west of its junction with Studio Way.

The proposed design will introduce significant improvements for pedestrians and cyclists by removing a number of existing barriers and disincentives to using these modes. Additionally, measures to offer more reliable, faster journey times for buses through the corridor. The design accommodates the traffic growth associated with the planned developments on Elstree Way. There is greater scope for management of through-traffic with the signalisation of the Tesco roundabout. To maximise the benefits of this signalisation of Shenley Road/Station Road would also be required, HCC have been developing a scheme for this junction as part of a separate study.

Appendix A fully details the key elements of the designs and **Appendix B** contains the design drawing 60278138-PRELIM-000-001.

Figure 10 – Excerpt from Appendix B



4.2 Pedestrian Facilities

All footways will be widened to a minimum of 4 metres for shared use footways and 5 metres for segregated cycle tracks with adjacent footways. The widened footways will allow increased space for pedestrians and cyclists, especially in peak periods when the footpaths can be busy with school pupils and commuters travelling to and from the transport links close to the town centre.

Footways will be fully reconstructed to provide a more comfortable pedestrian and cyclist environment and improved public realm.

Closure of numerous private accesses along Elstree Way will offer improved continuity. The remaining uncontrolled crossing points along Elstree Way are to be improved with the installation of tactile paving and raised surfaces at every side road access. This will help to control vehicle speeds and create an improved crossing experience.

The existing subway at Bullhead Road is to be infilled and landscaped. A Toucan crossing will be provided at carriageway level to the east of Bullhead Road. A further two toucan crossings are proposed, one to replace an uncontrolled crossing west of the petrol station exit and one is proposed to replace the uncontrolled crossing near Shenley Road roundabout.

Side roads will be given tightened geometry; this will reduce the crossing distances and increasing the amenity for pedestrians and cyclists. As a result of the tightened geometry, vehicle speeds would be expected to be reduced resulting in a safer crossing and a less intimidating environment.

4.3 Cycle Facilities

All proposed segregated footways throughout the EWC will be widened to 5 metres to allow a minimum width of 2m for pedestrians and 3m cycle track. This will promote safe two-way cycling on both sides of the road. The shared footway improvements would also be more convenient for cyclists and provide continuity to the cycle routes through Borehamwood and remove the need for cyclists to join the carriageway at Shenley Road roundabout.

Closure of private accesses and provision of raised entry treatments on Elstree Way will improve continuity of the cycle track and result in fewer undulations.

Three new stand-alone Toucan crossings would be provided on Elstree Way. These would provide safe crossing points for cyclists along the EWC, removing the severance of Elstree Way and increasing permeability.

4.4 Buses and Bus Stops

A westbound Bus Lane will provide bus priority, bypassing the roundabout and reducing bus journey times and making them more consistent.

All the bus stops along the EWC will be upgraded to ensure that they are fully accessible. Where possible bus stops will be removed from lay-bys to reduce delay to buses rejoining traffic.

4.5 Materials

Materials in accordance with the general HCC standard have been assumed throughout. Selected use of higher quality materials and surface dressings has been allowed at key junctions to reflect the vision set out in the AAP and reinforce the character and identity of the corridor. The existing public realm would be improved with materials that will be aesthetically pleasing without compromising quality or overall cost and ensure that maintenance of such materials is cost-effective.

All footways would be paved with an asphalt surface due to ease of maintenance along areas of shared use and segregated footways with a smooth quality finish for cycle use. Existing soft landscaping areas will be improved as a longer term aspiration, whilst areas of hand landscaping will require less maintenance. Provision of soft landscaping has been identified within the development site frontages which will enhance the feel of the area but not fall under the maintenance of HCC.

4.6 Summary

The assessment of the proposals set out in this report is based on objectives originating from the AAP. These objectives include the overall objective which form the basis for the policies in the AAP, and objectives from Policy EWC5: Transport and Accessibility which requires any development to improve connectivity into and out of the area. This ensures that both overall and transport objectives are met. Tables 3 and 4 highlight the objectives and how each existing issue has been addressed.

As shown in the Table 4, features of the proposed scheme meet the objectives set out in the EWC Area Action Plan. It provides an improved pedestrian and cycle friendly corridor into the heart of Borehamwood. The enhanced connections and crossing facilities reduce the risk of conflicts between the various road users, creating a safer, permeable urban corridor.

The removal of the Shenley Road/ Eldon Avenue roundabout will provide a more pedestrian friendly crossing environment. The use of sympathetic materials will reflect the importance of the corridor and the physical appearance will be aesthetically pleasing.

Table 3 – Area Action Plan Objectives

Objective	Area Action Plan Objectives	Source
A	Improve the physical appearance of the corridor into the town.	AAP objective
B	Link the commercial area of Borehamwood with the town centre.	AAP objective
C	Promote sustainable development.	AAP objective
D	Work in accordance with Hertfordshire Local Transport Plan and Elstree and Borehamwood Urban Transport Plan.	EWC5 – a)
E	Improve pedestrian connections and minimise the risk of conflicts between various road users.	EWC5 – b)
F	Contribute towards the funding of highway improvements such as recommended in this study.	EWC5 – c)
G	Implement and establish safe pedestrian and cycle crossings.	EWC5 – d)
H	Implement improvements to the cycle network along the corridor.	EWC5 – e)

Table 4 – How existing issues have been addressed and AAP Objectives met

Existing Issue	Measure	Objective
Indirect pedestrian and cyclist routings, off of desire lines between town centre and Elstree Way	Signalisation of the Tesco/Shenley Road roundabout allows for widened shared use footways along desire lines. Improved crossing points at Elstree Way/ Shenley Road roundabout allows for a better pedestrian/ cyclist experience.	A,B,C,E,G,H
Narrow, uneven footways and cycle facilities causing conflicts between users	All footways to be widened to a minimum of 2 metres. Where shared and segregated use is proposed, there will be a minimum of 4m. All footways to be fully reconstructed to fix structural failure.	A,B,C,D,E,G,H
Narrow cycle tracks do not promote two-way cycling	Cycle tracks widened to 3 metres to promote 2-way cycling on both sides of the carriageway.	A,C,D,F,G,H
Lack of bus priority along the route	Provide a bus lane on the westbound carriageways of Elstree Way and Shenley Road (W). Remove bus lay-bys where possible	C,D,E,F
Poor on carriageway cycle provision at roundabout	Cycle lanes to be removed and replaced with segregated or shared use off-road facilities throughout the length of Elstree Way Corridor.	B,C,D,G,H
Poor permeability for cyclists and pedestrians within/across the corridor, lack for controlled crossings	Five toucan crossing opportunities provided along Elstree Way and Shenley Road with improved two-way cycle facilities between them.	B,C,D,E,F,G,H
Poor public realm	High quality, aesthetically pleasing materials to be used.	A,B,C,E,G,H
Disused and unpleasant subway	Subway to be infilled and landscaped with pedestrians using a new Toucan crossing at surface level.	A, B, C, D,E, F, G,H
Numerous crossovers and private accesses	Raised crossings to be installed at each side road (off Elstree Way) to slow down vehicle speeds and allow for safe and improved crossing experience. All crossing points to be upgraded with the correct tactile paving.	A,B,C,D,E,F,G, H

5 Modelling

Traffic modelling was undertaken by AECOM to ascertain the impact of the design proposals on the road network on and around Elstree Way. The testing focussed on assessment during the typically busier PM peak period to ensure that the worst case situation was considered. The traffic modelling considered the full development scenario only with an appropriate increased number of trips generated by the development along EWC.

Modelling was undertaken using the existing approved SATURN and Paramics Base traffic models, supplied by HCC. The SATURN model was required to understand potential re-routing of traffic and the Paramics model for more detailed operational analysis of the local area of interest.

The conclusion from the modelling is that the proposed Elstree Way Corridor scheme performs at a level similar to current year conditions, assuming some traffic re-route away from the Shenley Road / Elstree Way roundabout approaches.

See Appendix D for more information.

6 Costings and Construction Phasing

6.1 Costings

A cost estimation exercise was undertaken by AECOM to give an outline cost for the construction and implementation of the proposed scheme. Table 5 should be read in conjunction with AECOM preliminary design drawing 60278138-PRELIM-000-001in Appendix B.

Table 5 – Estimated costs

Item Description	Cost
Phase 1	£1,400,000.00
Phase 2	£1,100,000.00
Phase 3	£600,000.00
Total	**£3,100,000.00**

The costs have been based on the following assumptions:

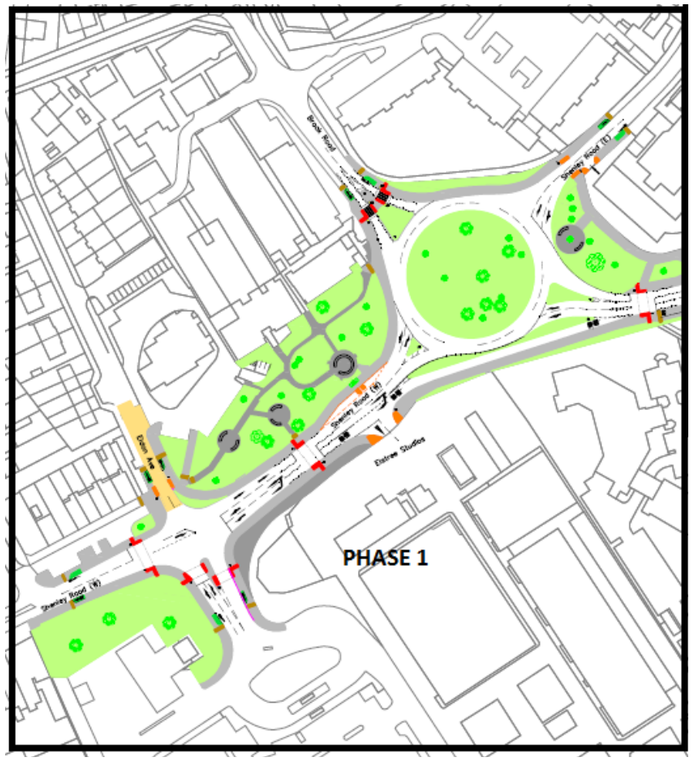
- This estimate is subject to detailed design and prices may vary dependent upon final design and materials as well as the procurement route taken. Detailed design costs have been excluded.
- Estimate prepared based upon assumed materials, rates and construction details.
- 40mm resurfacing of the full carriageway within the scheme extents has been allowed for, full carriageway construction has only been allowed for beneath proposed areas of carriageway that are not currently carriageway.
- Footway/cycle track areas have been assumed to be paved in black bituminous material.
- Soft landscaping has been assumed to be grass / low growing vegetation.
- Hard landscaping has been assumed to be high quality paving or surface treatments such as bound gravel.
- Traffic modelling for the scheme that was costed is subject to approval by HCC and this may require the scheme design to change.
- No allowance has been made for the removal or relocation of any statutory undertakers' equipment or plant.
- Should the scheme be constructed in multiple phases the cost may vary.
- No allowance has been for uplift for working hour restrictions.
- No allowance has been made for legal costs where minor land transfer is required.

6.2 Construction Phasing

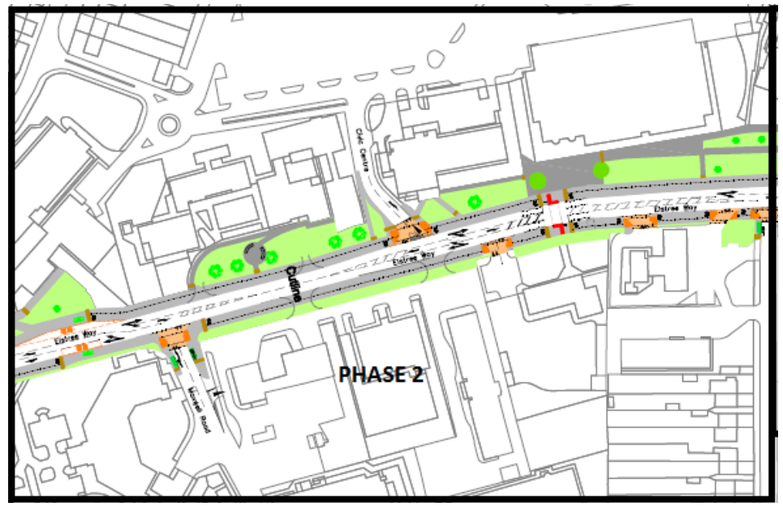
AECOM recommends the following phasing plan to implement the construction of the proposed design for Elstree Way Corridor. This phasing plan recommends construction phases that have the least impact on users and enable safe creation of the improved facilities.

AECOM consider Phase 1 to be the most important section of Elstree Way Corridor in terms of pedestrian movement and vehicle flow. It is recognised that as the gateway to the town centre, this area is a key location to improve first.

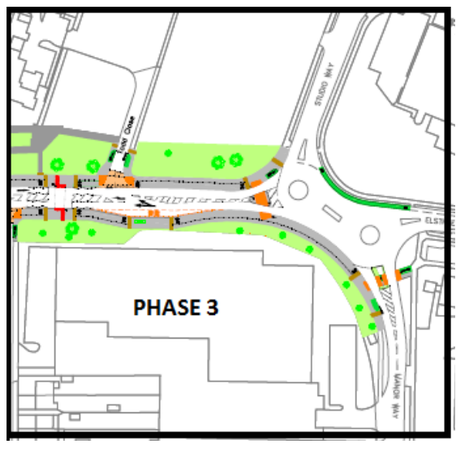
6.3 Phase 1 – Shenley Road/ Eldon Avenue (Tesco) Roundabout and Shenley Road/ Elstree Way roundabout.



6.4 Phase 2 – Elstree Way: Shenley Road Roundabout to Bullhead Way.



6.5 Phase 3 – Elstree Way: Bullhead Road to Studio Way



7 Appendices

Appendix A - Scheme Overview

The proposed scheme has a number of key elements that form part of the overall layout. This section describes these elements and is best read in conjunction with the scheme design plan (60278138-PRELIM-000-001), available in Appendix B.

- Removal of Shenley Road / Eldon Avenue roundabout replacement with a traffic signal controlled junction.
- Improvement of all crossing points linking roads on approach to Elstree Way/ Shenley Road roundabout.
- Minimum 3.2m lane widths in each direction on Elstree Way
- Improved pedestrian and two-way segregated off-road cycle facilities including Toucan crossings
- Shared use facility where it is not feasible to install segregated.
- Removal and infilling of subway at Bullhead Road.

7.1 Pedestrian and Cycle Facilities and Urban Realm

- Shared use footways proposed at 4m wide and predominantly 3m wide two-way cycle tracks on segregated paths.
- Three new stand alone Toucan crossings on Elstree Way as well two along Shenley Road (W) and one at the Tesco access road.
- Minimum 2m wide footways and widening to up to 4m within the proposed shared use areas.

7.2 Tesco / Shenley Road junction

- Converted from a roundabout to a four arm signalised junction.
- Toucan crossings provided across the south and east of the junction, there is also a controlled crossing proposed to the west, centred between the junction and the Elstree Way roundabout.
- Shared use facilities on all corners of the junction.
- Dropped kerbs to allow cyclists to access/exit the off-road cycle tracks.
- Improved alignment for pedestrians on east-west route with better visibility of shopping destinations.
- Proposed surface treatment along Eldon Avenue.
- Landscaping / streetscape improvements.

7.3 Shenley Road (W) Upgrade

- Land gain to the north and south.
- Proposed toucan crossing positioned in a central location between the junctions.
- Wider footways on desire line (4m shared use facilities on both sides).
- Westbound bus lane provided on Shenley Road westbound approach from Elstree Way.

7.4 Elstree Way / Shenley Road / Brook Road (Shenley Road Roundabout)

- Improved crossing facility at Brook Road with a zebra crossing and widened central refuge.
- Improved safer uncontrolled location on Shenley Road (E).
- Proposed toucan crossing on Elstree Way.
- Elstree studios entrance to be relocated approximately 25 metres to west (away from the roundabout).
- 3m two-way cycle track on both sides of Elstree Way and 4m shared use facility where this isn't possible due to crossings and bus stops.
- Westbound bus lane provided on approach so buses can avoid giving way at the roundabout.

7.5 Maxwell Road Junction

- Raised crossing over the bell mouth of Maxwell Road.
- New access point to Fire Station site on Maxwell Road (part of future development).
- Two existing accesses (Fire Station, Housing Association) on southern side of Elstree Way to be closed and regraded (part of future development).

7.6 Benefits

- Improved facilities for cyclists and pedestrians at all junctions.
- Integrated cycle network along the route allowing comfortable and safe two-way cycling on either side of the road.
- Proposals more aligned with modelling recommendations, giving greater likelihood of achieving capacity requirements
- Provision of westbound bus lane for public transport benefit

7.7 Appendix B – Scheme Drawings

See drawings 60278138-PRELIM-000-001

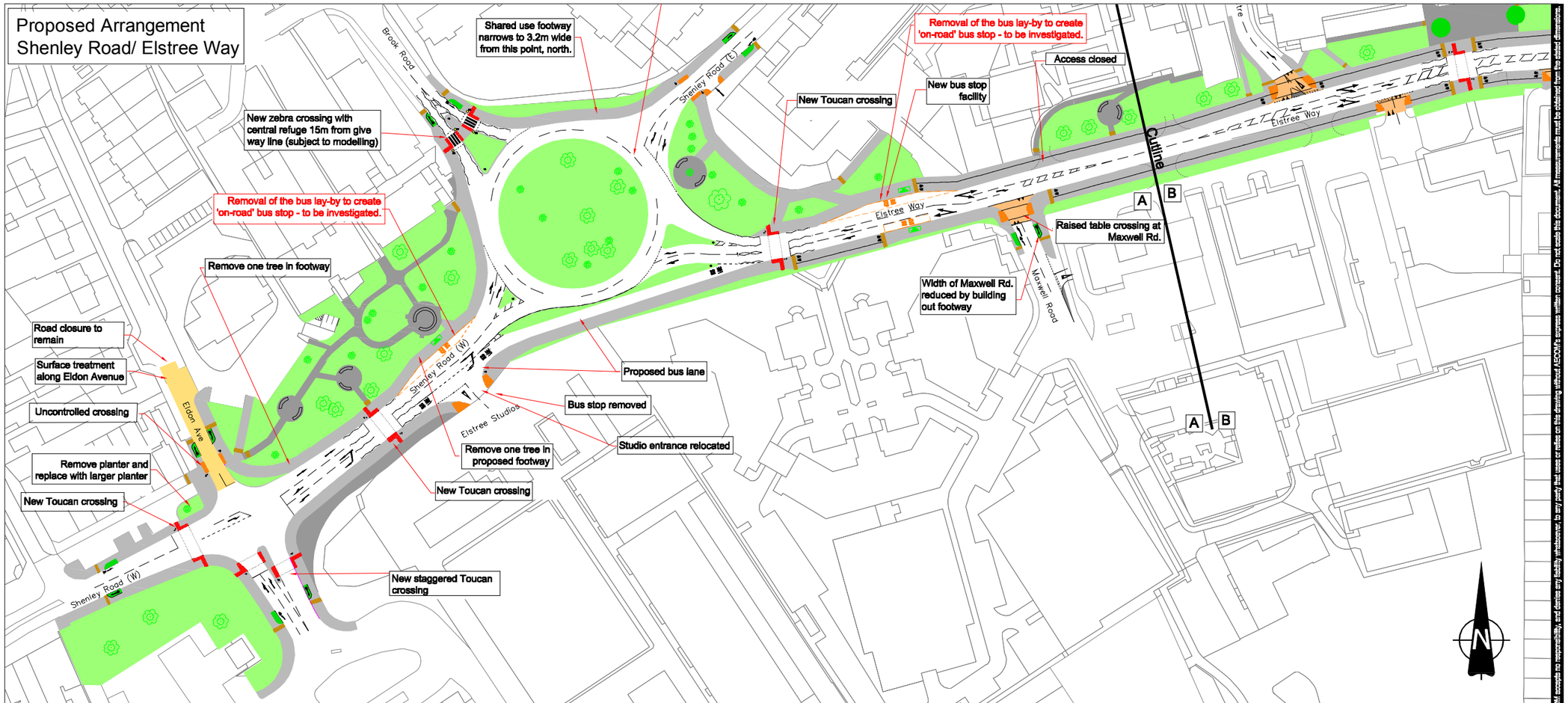
7.8 Appendix C – Construction Phasing Plan

See drawings 60278138-PHASING-000-002

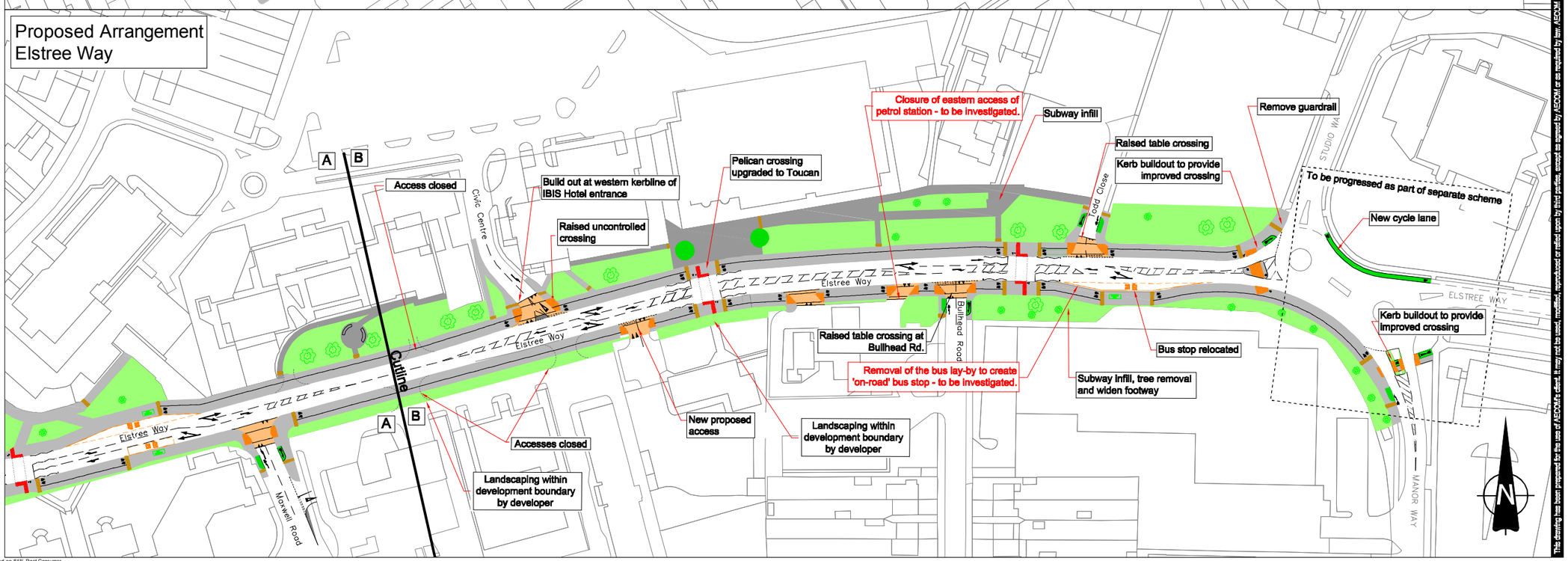
7.9 Appendix D - Modelling Technical Note

Appendix B

Proposed Arrangement Shenley Road/ Elstree Way



Proposed Arrangement Elstree Way



PROJECT

Elstree Way Corridor
60278138

CLIENT

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TOPOGRAPHICAL DATA

Premier Surveys Ltd.

NOTES

- Grass/ Landscaping
- New bus shelter
- Tactile paving (buff colour)
- Tactile paving (red colour)
- Tactile paving (corduroy)
- Surface treatment (paving)
- Raised entry with uncontrolled crossings
- Hard Landscaping (paving)
- Footway to be resurfaced
- Segregated footway
- T Traffic Signal Pole
- BB Belisha Beackon
- B Bollard
- Tree/ shrub

A: All shared use footway areas are to be 4m wide unless specified. All segregated footways are 3m cycleway and 2m pedestrian footway unless specified.

1. This drawing is not intended for construction
2. Street lighting, drainage and any impact on statutory undertaker equipment to be considered at detailed design stage
3. All new lines and road markings are to be laid in accordance with "The Traffic Signs Regulations and General Directions 2002" (TSRGD)
4. All map lines shown in grey are existing and are to remain unless shown otherwise
5. All dimensions in metres, unless otherwise stated
6. Drawing based on topographical surveys by Premier Surveys on November 2012.
7. Traffic signal layouts design subject to traffic modeling to be completed
8. Materials to be in accordance with Roads in Hertfordshire guidance

DRAFT
NOT FOR CONSTRUCTION

ISSUE/REVISION

I/R	DATE	DESCRIPTION

DRAWING NUMBER

60278138-PRELIM-000-001

SHEET TITLE

Elstree Way Corridor

SHEET NUMBER

1 of 1

SCALE

1:500 @ A3

Last saved by: ALMONDC(2014-07-18) Last Plotted: 2014-07-18
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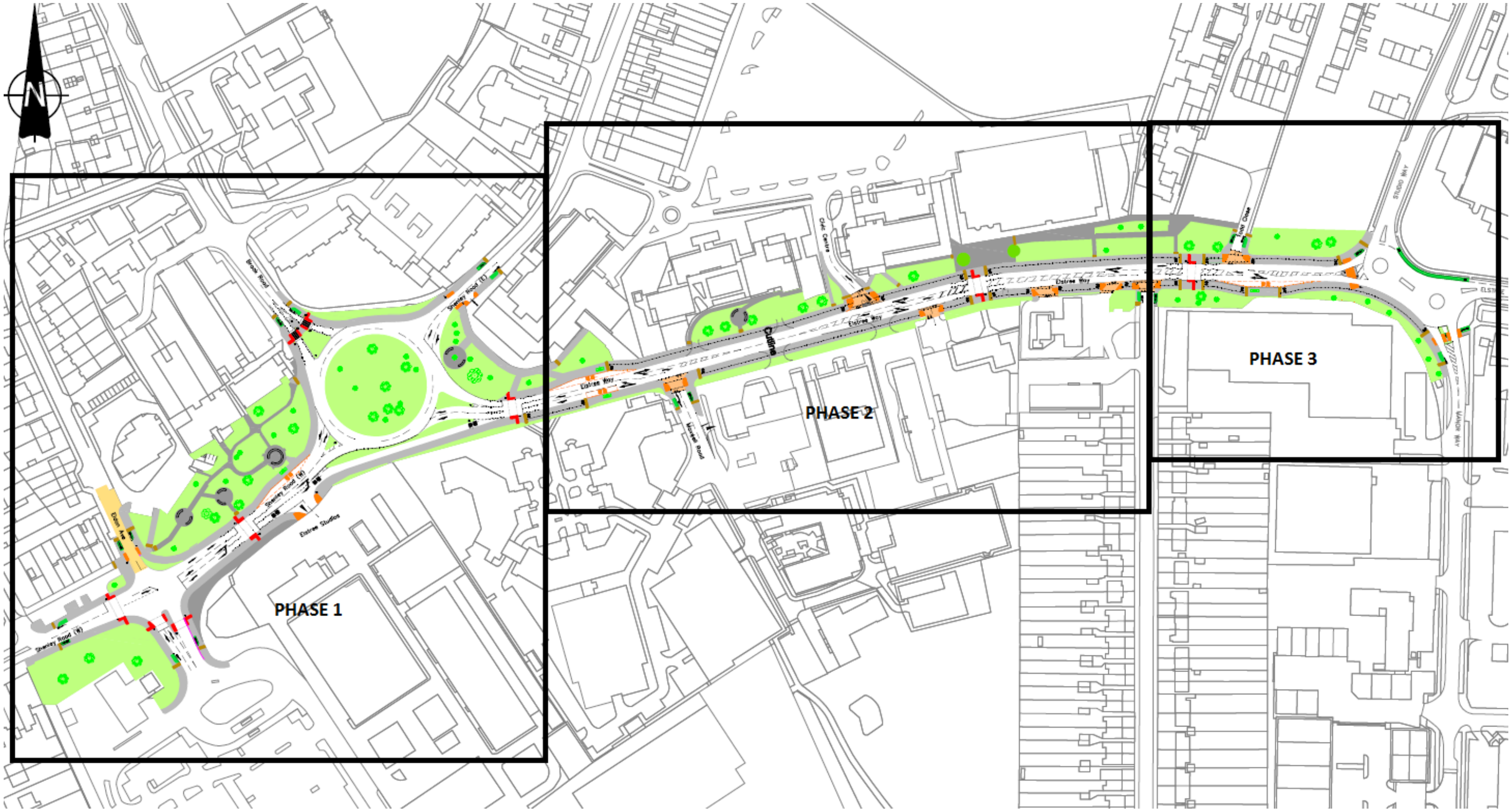
Appendix C


PHASE 1
PHASE 2
PHASE 3
Brook Road
Shealey Road (E)
Shealey Road (W)
Eden Ave
Elstree Studios
Elstree Way
Civic Centre
Duke's Avenue
Manor Road
Tower Close
Studio Way
Manor Way

Appendix D

Project:	**Elstree Way Corridor**	Job No:	**60278138**
Subject:	**PM Peak Traffic Model Analysis of Scheme 3**		
Prepared by:	**Leire Balzategui Urrutia**	Date:	**04 July 2014**
Checked by:	**Gareth Jones**	Date:	**16 July 2014**
Approved by:	**Ian Burrows**	Date:	**7 July 2014**

1. Introduction and Context

AECOM has been requested by Hertsmere Borough Council (HBC) to assist them in the preparing robust scheme proposals with associated cost estimates for alterations to the Elstree Way Corridor.

The purpose of the scheme is to encourage the use of alternative modes of travel other than car, while not having a severe effect on the capacity for traffic to route through the centre of Borehamwood. The scheme development has gone through an iterative process, to reach this point. Previous potential schemes reduced traffic capacity beyond an acceptable level, whereas this scheme, while still benefiting non car users, has less of an impact on capacity through the corridor.

The proposed scheme has been developed in discussions with HBC and Hertfordshire County Council (HCC), going through a process of scheme refinement. For the purposes of this note, the new version of the scheme will be referred to as **Scheme 3**.

The broad scheme area is highlighted with a red perimeter and the primary area of interest is highlighted with a blue perimeter in **Figure 1.**

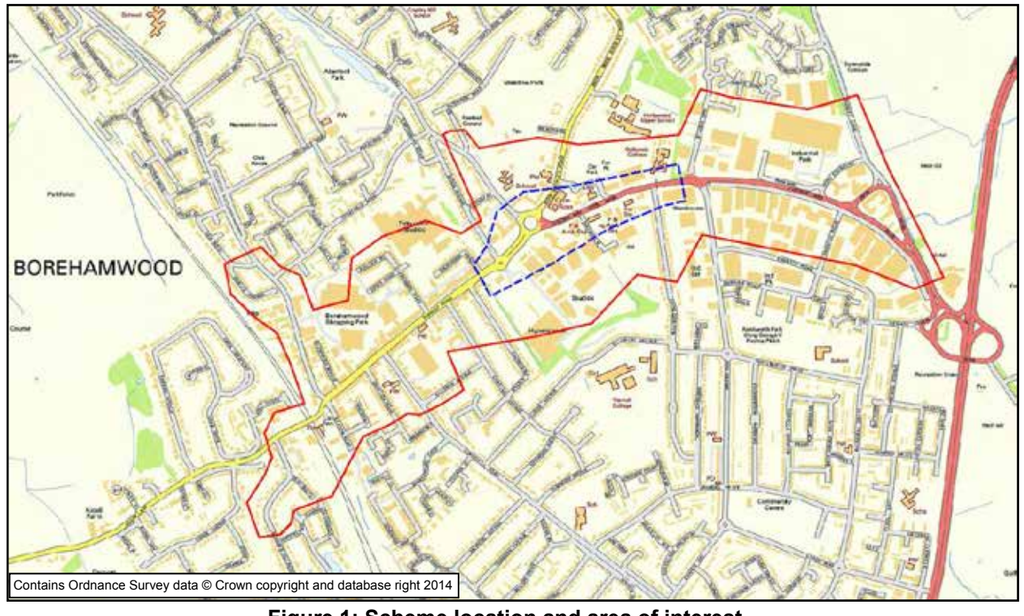


Figure 1: Scheme location and area of interest

A strategic SATURN traffic model has been used to analyse the traffic impacts of Scheme 3 at a wider level and a localised S-Paramics model has been used to analyse the scheme at a corridor level, identifying its operational impact.

The updated scheme includes:

- New toucan crossings
- Bus lane sections
- New bus stop facilities
- Upgrade of pelican to toucan crossings
- Relocation of the studio entrance on Shenley Road before Brook Road / Elstree Way / Shenley Road roundabout
- Road kerb realignments and
- Access amendments for some minor roads

The purpose of this Technical Note is to describe the model developed to represent the proposed Scheme 3 (for a future year 2026 scenario) and to compare the outputs of this latest proposal to the Base scenario (existing situation as at 2010).

This note should be read in conjunction with the previous notes, in particular with reference to the assumptions made behind the modelling approach.

This Technical Note has the following sections:

2. **Scheme 3 Testing**
3. **Summary & Conclusions**

2. Scheme 3 Testing

This section sets out the review of the Elstree Way corridor model and summarises the results of the modelling, by comparing Scheme 3 outputs against the Base scenario for the PM peak time period.

Future Year (2026) Scheme Network Assumptions

Modelled road network characteristics, development trip rates and driver behaviour assumptions are as in previous versions of the model, building upon the Base model. Previous reporting should be referred to for additional information, in particular with regards to potential re-routing.

Operational Corridor Assessment

SATURN Wider Analysis & S-Paramics Demand Derivation

Traffic demand for the future year 2026 has been extracted from a cordoned network of the wider strategic SATURN model and inputted into the S-Paramics model, using the same method as applied previously. The SATURN model future demand has been maintained from the previous scheme analysis.

Analysis of the SATURN model suggests that the implementation of Scheme 3 results in some traffic re-routing away from the centre of the corridor. A comparison of traffic flows between Scheme 3 and the Base scenario centred on the Elstree Way / Brook Road / Shenley Road roundabout is shown in **Appendix A**. Comparative flows for the key links meeting at this roundabout, shown in **Figure 2**, are presented in the table below:

Table 1 – Comparison of PM Peak hourly flows (in PCUs) for Base Scenario and Scheme 3

Road	*Direction*	*Base Flow*	*Scheme 3 Flow*	*Difference*	*Relative Difference (%)*
A - Brook Road	Northbound	617	714	+97	+16%
	Southbound	523	595	+72	+14%
B - Shenley Road North	Northbound	385	392	+7	+2%
	Southbound	419	317	-102	-24%
C - Elstree Way	Eastbound	1000	1004	+4	0%
	Westbound	1128	1083	-45	-4%

D- Shenley Road South	Northbound	923	868	-55	-6%
	Southbound	999	753	-246	-25%

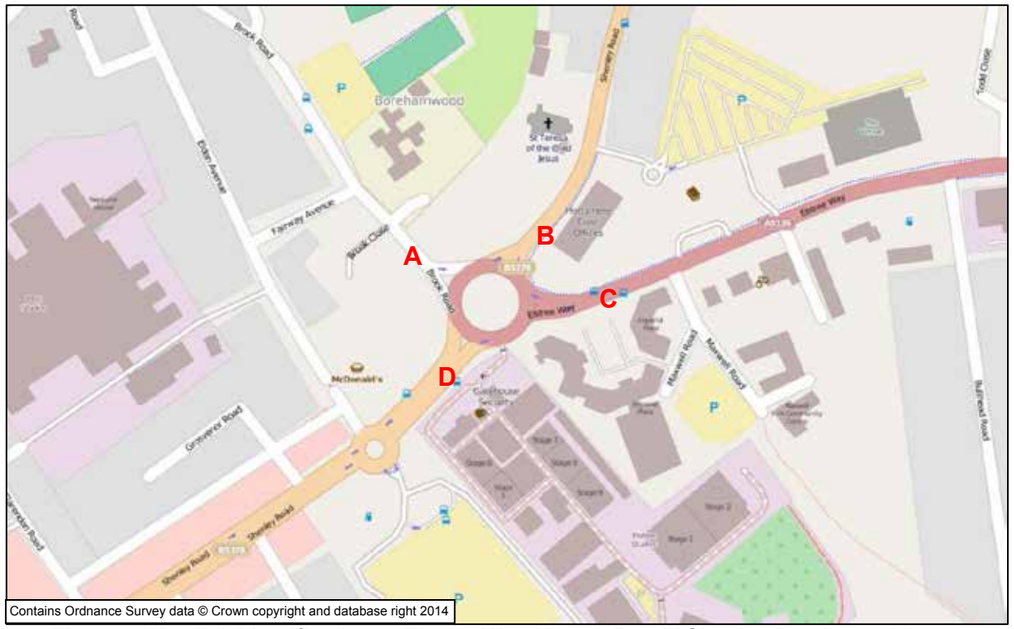


Figure 2: Key link identification at Elstree Way / Brook Road / Shenley Road roundabout

A comparison of SATURN flows between Scheme 3 and the Base case shows;

- A decrease in traffic accessing the roundabout from Shenley Road North due to the reduced capacity of the entry approach to provide a wider footway for shared use and capacity constraints when the Tesco roundabout is converted to a signalised crossroads;A decrease in traffic along Shenley Road South, particularly in the southbound direction, resulting from changing the Tesco roundabout to a signalised crossroad and reduced traffic from Shenley Road North;
- Little change in traffic using Elstree Way, with a slight decrease westbound - potentially affected by the new Toucan crossing, but more likely due to capacity constraints associated with the Tesco junction; and
- Increased traffic along Brook Road in both directions.

Taking an average of the flows passing through the Elstree Way / Shenley Road junction, there is a 4% decrease in the Scheme 3 PM peak compared to the Base PM peak flows. Across the cordon defined for the S-Paramics model as a whole however, traffic increases by 7% from the Base case to Scheme 3.

The reduced traffic through the central area and the increased traffic in the overall network suggest that vehicles are transferring to the wider area due to the changes implemented in the Elstree Way corridor. This assumes there is sufficient capacity elsewhere for traffic to make this alternative re-routing.

A comparison of the Scheme 3 scenario with a 2026 Do-Nothing scenario (Base year network) supports the suggestion that the scheme would reduce capacity and result in re-routing. A comparison of the two scenarios is shown in Appendix A. This compares PM peak actual flows (pcu/hr) between Scheme 3 and the 2026 Do Nothing scenario, with blue showing a decrease in actual flows and green showing an increase in actual flows as a result of Scheme 3 implementation. The analysis shows there is an increase in traffic through Theobald St and along Furzehill Rd / Hillside Ave / Kenilworth Dr / Manor

Way. The latter is the route to which traffic is suggested to divert to with the implementation of he proposed scheme changes.

S-Paramics Analysis Corridor Analysis

The following analysis compares the outputs of the local corridor model for Scheme 3 against the Base scenario.

Screen shots of the network conditions as estimated in the S-Paramics model at 30-minute intervals are included in **Appendix B**.

Looking at the screen shots of Scheme 3 and the Base scenario, it can be seen that the performance of the model is satisfactory in most areas.

The primary pinch point is the Shenley Road / Eldon Ave / Tesco crossroad, with a significant queue propagating along the Tesco exit. It should be noted that this junction is particularly sensitive, as it is forecast at the edge of capacity. Allocated a larger proportion of the green time of the Tesco junction to the Tesco approach, can result in significant increases in queuing for eastbound and westbound traffic movements.

Journey time route comparison

Figure 3 below shows the journey time routes which have been used as part of the comparison between the performance of the Base scenario and Scheme 3.

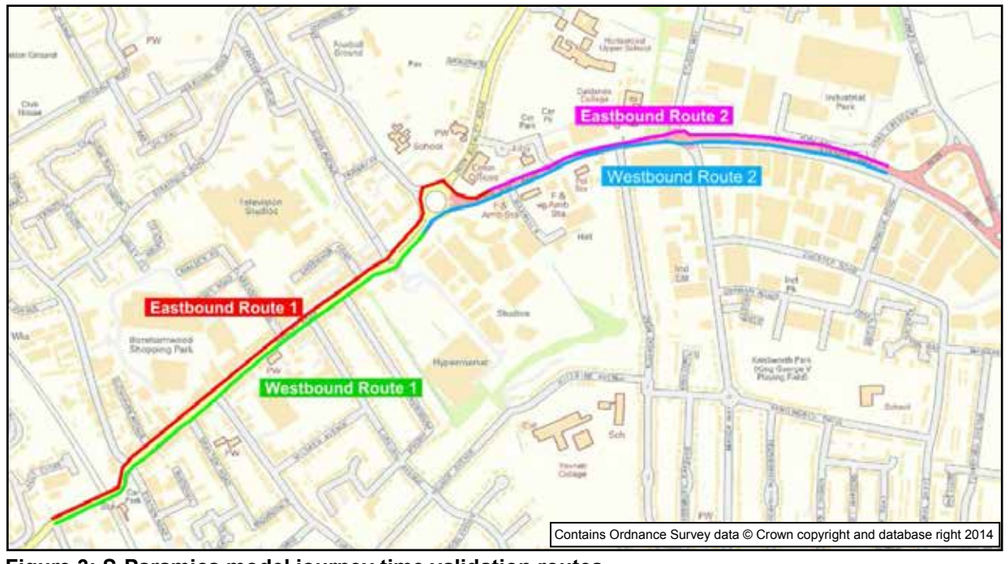


Figure 3: S-Paramics model journey time validation routes

Figure 4 below shows journey time route outputs for the Paramics model for the Base (Base) and Scheme 3 (NS3) scenarios.

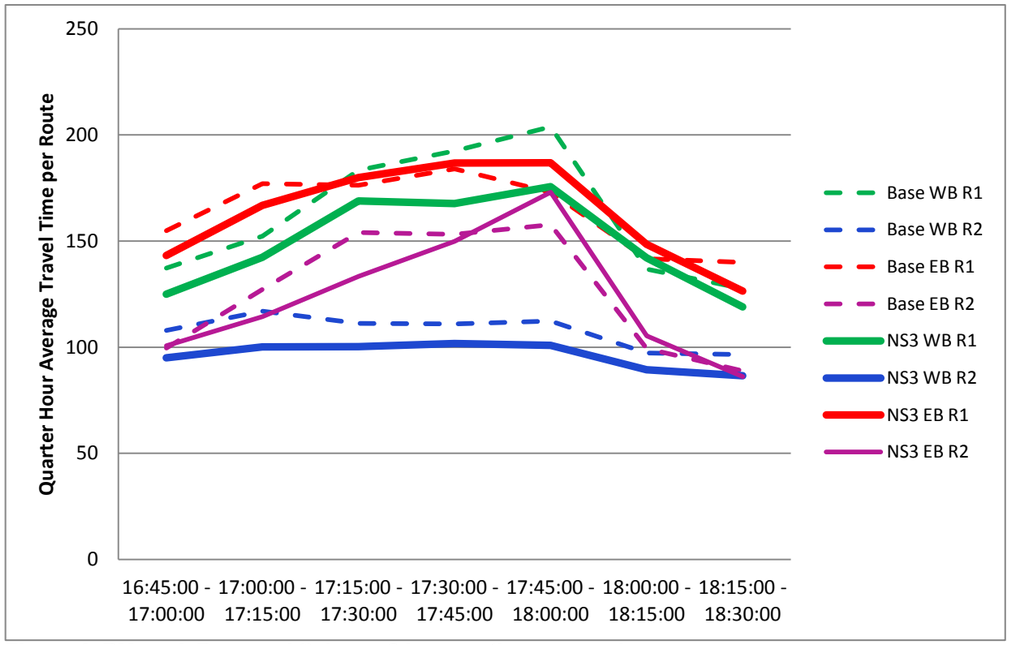


Figure 4: PM peak Base and Scheme 3 journey time comparison

Scheme 3 journey times along these routes are forecast to generally remain at similar levels to the Base year scenario. However, this does assume the re-routing of some traffic away from the central Elstree Way / Shenley Road roundabout. If this traffic did not re-route, then delay would likely be higher in the Scheme 3 scenario compared to the Base scenario.

3. Summary & Conclusions

This Technical Note has presented the comparison between the proposed 2026 Scheme (3) and the Base Scenario for the PM Peak period for the Elstree Way corridor in Borehamwood.

This section summarises the key findings of the analysis undertaken and suggests the way forward.

Summary of Findings

The scheme's impact on the corridor can be summarised as follows;

- Comparing the modelled scheme (for a future year of 2026) with the existing situation for the Base year (2010), the average PM peak hourly traffic levels increase by approximately 7% within the Elstree Way corridor (as defined by the extent of the Paramics model).
- There is however, a decrease in traffic of approximately 4% for the central roundabout junction of Elstree Way and Shenley Road. This suggests that traffic would seek to re-route around this central point, as capacity is forecast to be more constrained at this point to an extent when compared with the current network layout.
- Looking at the main eastbound and westbound routes along Elstree Way, the journey times for the scheme scenario are forecast to be at a similar level to the Base situation.
- The Tesco junction however, is a pinch point under the scheme scenario. It is estimated to operate on the edge of capacity during the modelled peak period.

- With the scheme in place, there is a redistribution of traffic queuing within the corridor, with a notable increase at the Shenley Road / Eldon Ave / Tesco signalised junction. There are queues propagating back along the exit from Tesco with the scheme in place, though these last for only part of the modelled peak hour.
- If for the signalised junction, additional green time is given to the Tesco approach in an attempt to reduce queuing for the Tesco traffic, by reducing green time for traffic on Shenley Road, there is a notable increase in queues along Shenley Road, assuming the same traffic flows.
- The introduction of the signals at the Tesco junction, does however improve accessibility through the junction for non car users. This, combined with other aspects of the scheme, should encourage more people to use non car modes.
- It is noted that the amount of traffic re-routing away from the central junction of Elstree Way and Shenley Road is less under this scheme proposal than previous scheme proposals.
- A number of assumptions are inherent to the modelling process and these should be reviewed in tandem with the interpretation of model results.

Conclusion

The conclusion of the above analysis is that the proposed Elstree Way Corridor scheme is expected to have some impact; it provides greater connectivity for non car users, but does reduce traffic capacity to an extent.

The overall performance of the network is indicated to perform at a level similar to current year conditions, assuming some traffic can and does re-route away from the central Shenley Road / Elstree Way roundabout approaches.

Scheme 3 includes a pinch point at the Shenley Road / Eldon Ave / Tesco signalised junction, where there appears to be significant queuing at the junction approach from Tesco during the peak period. It is important to consider the sensitivity of this junction, if additional green time is given to the Tesco approach, the eastbound/westbound movement (through traffic) is shown to get significantly worse.

It is recommended that additional testing such as for the AM peak period, would help inform the performance of the scheme.

Assumptions
As for previous analysis, it should be noted that a number of assumptions have been made to undertake the modelling work and associated analysis. These assumptions are the same ones as in the previous modelling analyses, which should be referred to in tandem for the interpretation of this note.

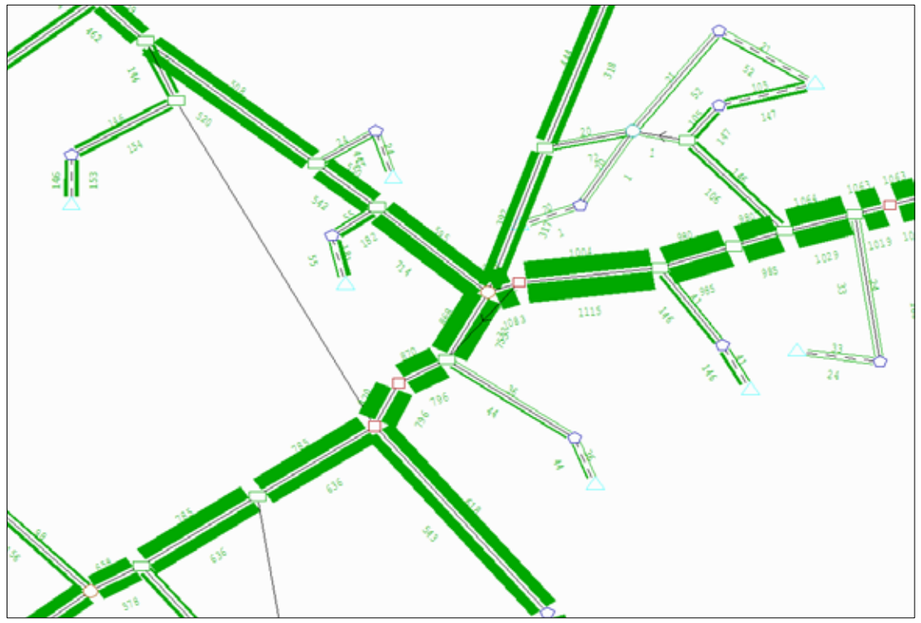
Way Forward

It is recommended that additional testing of the scheme for the AM peak period should be conducted, to investigate the traffic impacts of Scheme 3 on the local corridor at the morning peak period.

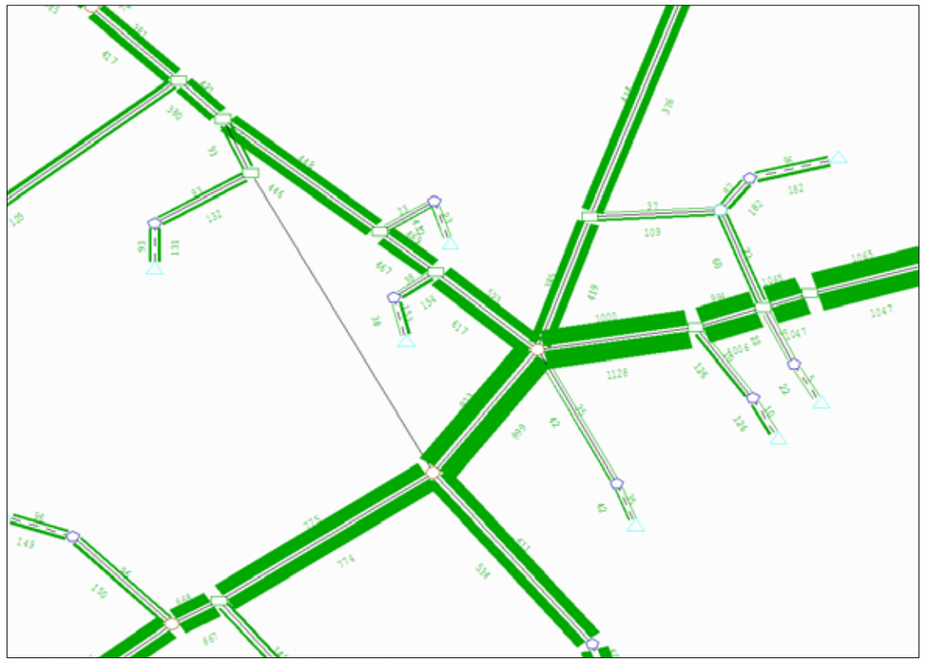
Furthermore, it will be important to understand and provide an understanding of how the scheme should be phased. This should be linked to the availability of funding.

Appendix A

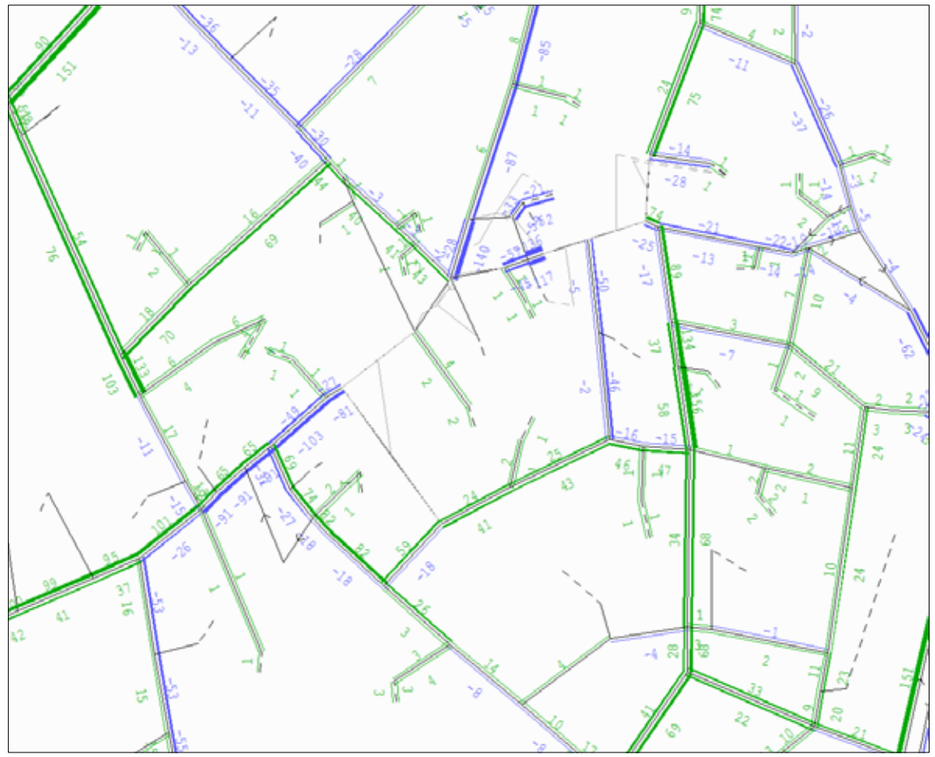
Strategic Assessment and Comparison of Scheme



EWC - Scheme 3 PM peak hour flows



EWC – Base Scenario PM peak hour flows



EWC – PM peak Actual Flow difference between Scheme 3 and 2026 Do Nothing scenario

Appendix B

Operational Assessment

EWC – Scheme 3 PM Peak

17.30

18.00

EWC – Base Scenario PM Peak

17.30

18.00