

COMET St Albans Enhancement

Progress meeting



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09 March 2017

This Presentation

- Introduction
- Highway and Public Transport Modelling
 - Network Enhancement
 - Highway Model Cordon/Screenline Definition

Data Collection

Base Year Calibration and Validation – Highway Model

- Public Transport Modelling
 - Base Year Validation – Public Transport Model
- Next Steps

Introduction

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Context

- Hertfordshire County Council (HCC) commissioned AECOM to develop a strategic countywide multi-modal model, COMET
 - A first version, with Base Year 2014, was delivered in February 2016
- The first enhancement of the model was undertaken in the second half of 2016. Changes were undertaken to the Prior Matrix (overall) and in particular to calibration and validation of model in Watford and its vicinity, as this area was included in the Growth and Transport Plan (GTP) work due in 2016/17.

The enhancement work also included (where possible) updates to the official modelling standards. This resulted in COMET V2.
- SADC commissioned AECOM in Autumn 2016 to use COMET V2 to aid the development of its Detailed Local Plan.

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Context

- SADC highlighted the following:
 - The current task objectives are “to review the performance of the COMET model in the St Albans District area, collect new data and enhance the model as necessary”.
 - In addition, this work will be followed by Task 6 (out of the current scope) which will use the enhanced COMET V3 “to test the implications of Local Plan growth and adequacy of identified mitigation measures”.
 - Task 5, the preliminary design of schemes to be tested in Task 6, is currently being progressed by AECOMs Highways Team.

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The overall objective for this COMET model enhancement work is to:

- Have a good representation of St Albans and Harpenden areas to test the cumulative growth from the Local Plan alongside broad, strategic-level interventions in St Albans District; and
- Be able to demonstrate the scale and location of the impacts from both Local Plan growth and potential strategic schemes.

Highway and PT Modelling- Network Enhancement

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2014 Base Year Highway Network Enhancement

- COMET network around St Albans & Harpenden reviewed and enhanced:
 - Existing network reviewed against historical Google information, the COMET coding manual and signal timing information
 - Links added to ensure all key movements could be recorded

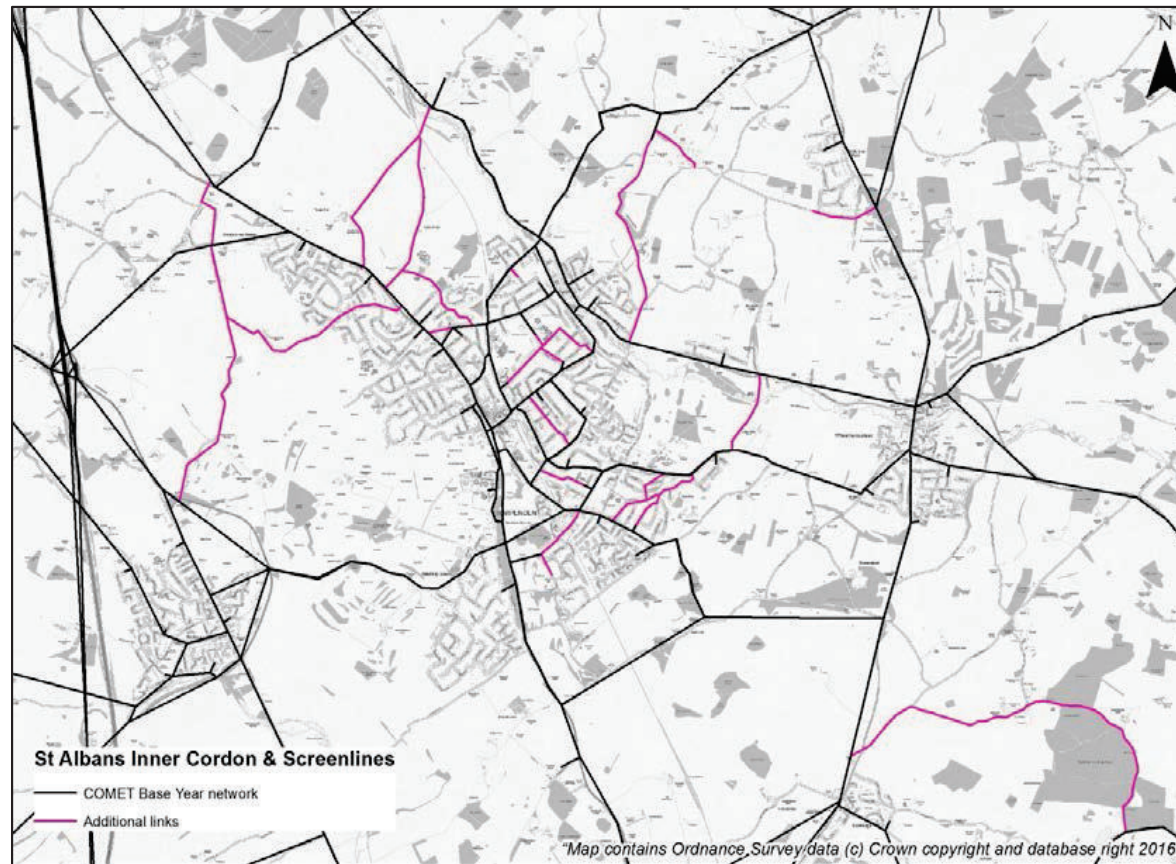
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2014 Base Year Highway Network Enhancement

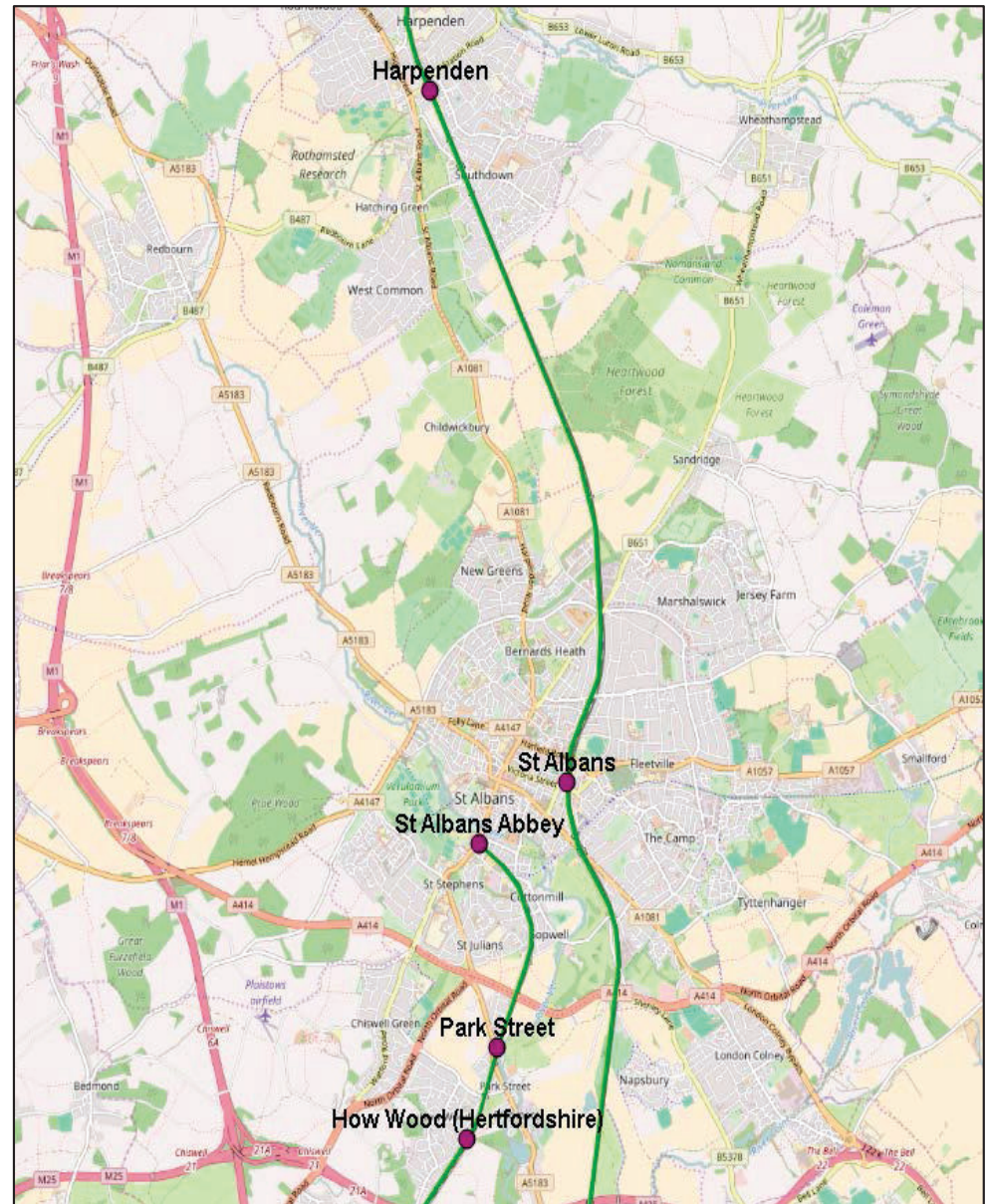
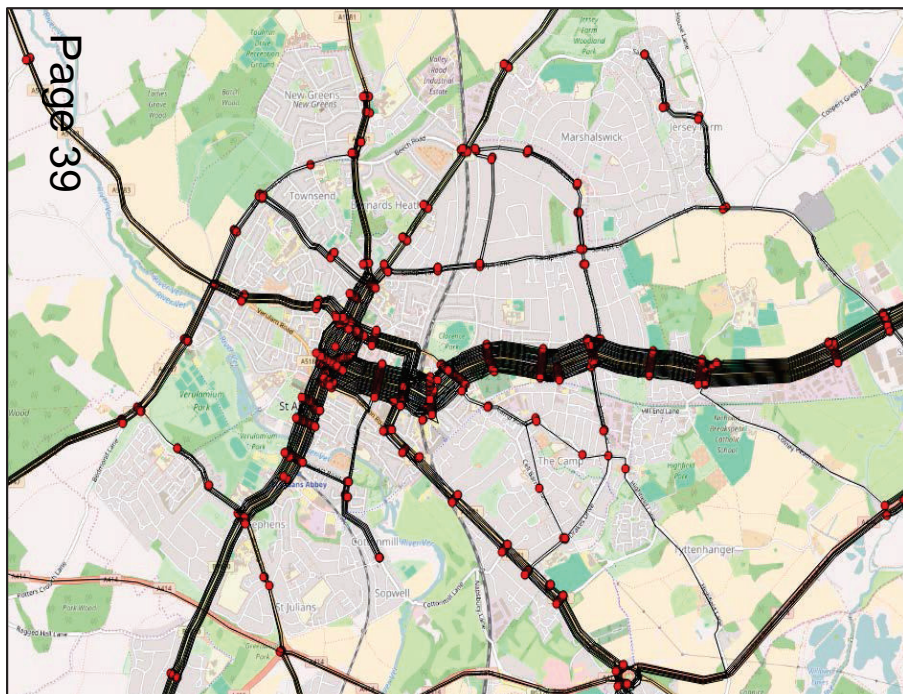
- COMET network around St Albans & Harpenden reviewed and enhanced:
 - Harpenden contains a lot more rural roads than St Albans and care was taken to ensure smaller roads were coded correctly
 - Thorough review of the mainline road network undertaken and small issues corrected

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2014 Base Year Public Transport Network

- COMET PT network in St Albans District reviewed and concluded that no amendments were required



Highway Network Enhancement – Speed Limit Changes

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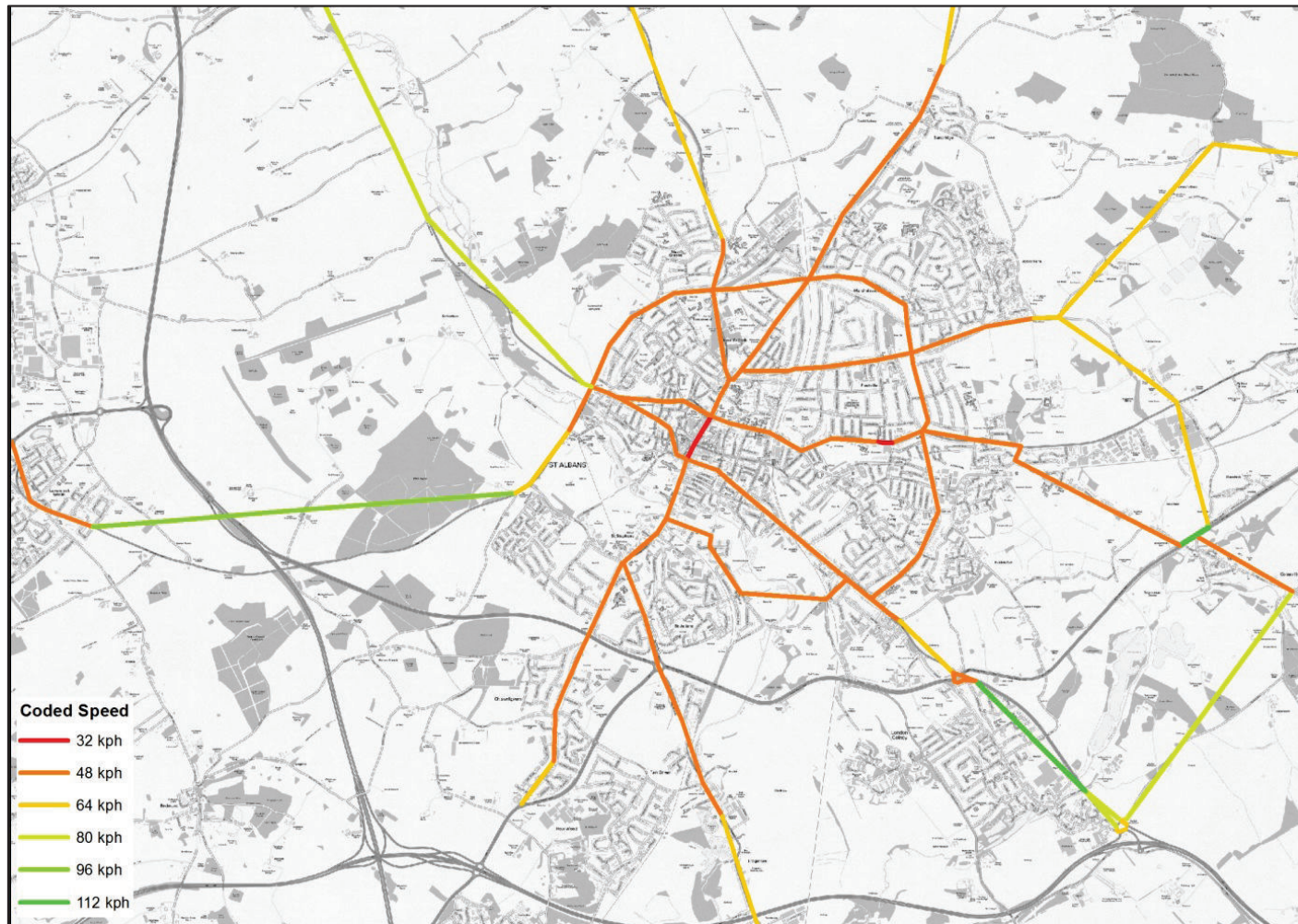
2014 Base Year Highway Network Enhancement

- Noted from COMET V2 application that journey time results vary in urban areas.
- Initial results from the St Albans Journey Time analysis resulted in poor journey time validation on routes through/around St Albans. Modelled times were quicker by an average of 2 minutes (-20% average across all routes).
- Conventional COMET V2 SATURN coding includes a 48km/h (30mph) speed limit on urban links without speed flow curves.
- Tests were undertaken to replicate the speeds recorded by the TrafficMaster data.

2014 Base Year Highway Network Enhancement

Original coding of St Albans coded urban links at 48km/h (only links used in journey times shown):

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2014 Base Year Highway Network Enhancement

TrafficMaster St Albans data shows actual speeds are much lower. Majority of links between 10 – 40 km/h.

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2014 Base Year Highway Network Enhancement

Original coding of Harpenden urban links at 48 or 64 km/h:

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2014 Base Year Highway Network Enhancement

TrafficMaster Harpenden data shows actual speeds are much lower. Majority of links between 20 – 40 km/h.

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2014 Base Year Highway Network Enhancement

Our approach to replicating TrafficMaster speeds used 3 approaches. Speeds of 10, 20, 30 and 40km/h replaced the standard 48 km/h:

1. Blanket changes in concentric zones radiating out from the town centres of St Albans and Harpenden. Links with speed flow curves were included;

2. Blanket changes in concentric zones radiating out from the town centres of St Albans and Harpenden. Links with speed flow curves were excluded; and

3. More detailed directional and time period specific changes on urban links without speed flow curves.

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2014 Base Year Highway Network Enhancement – Indicative Test Results

The table below highlights indicative early test results on the number of St Albans journey time routes meeting WebTAG criteria. Modelled times along routes should be within 15% of surveyed times (or 1 minute, if higher than 15%).

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Assignment (prior to matrix estimation)	AM	IP	PM
Initial St Albans Assignment	32%	48%	30%
Speed restrictions on all urban links	60%	67%	57%
Speed restrictions on urban links without Speed Flow Curves	61%	57%	66%
Directional/time period specific speed limit changes on urban links	73%	57%	64%

2014 Base Year Highway Network Enhancement

- Conclude that speed limits in urban areas need coding more carefully. A blanket 48km/h approach is no longer appropriate.
- Additional resources should be spent identifying speeds through key urban areas during project scoping. This has become the new precedent for future COMET applications and has been applied in St Albans and Harpenden.
- Implementing the above, COMET no longer defaults to under estimating journey times through urban areas.
- Links may have different speed limits depending on the time of day.

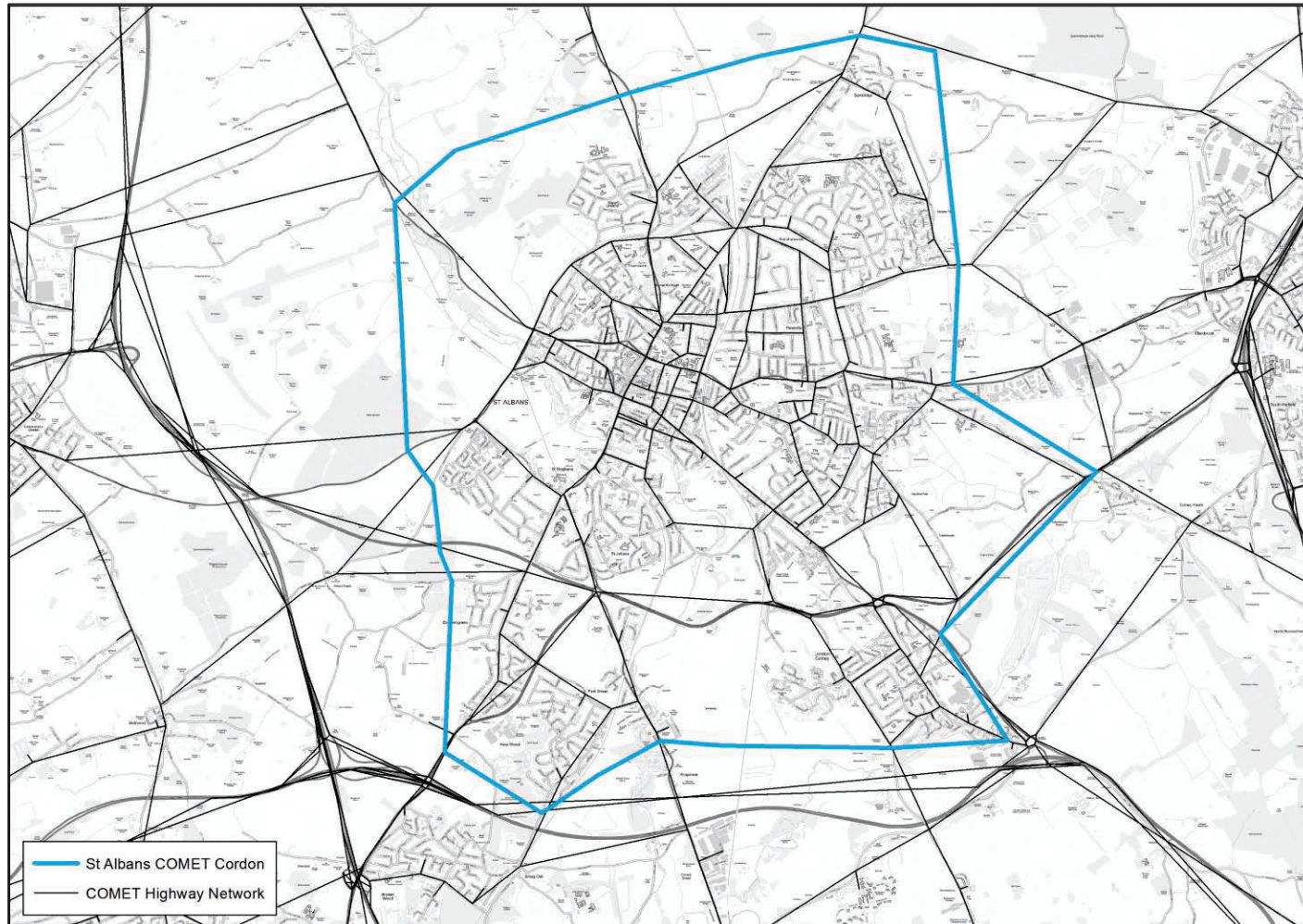
Highway Modelling

- Cordon / Screenline Definition

Cordon / Screenline Definition

In addition to the existing COMET St Albans and Harpenden cordons, screenlines were defined to ensure movements were captured.

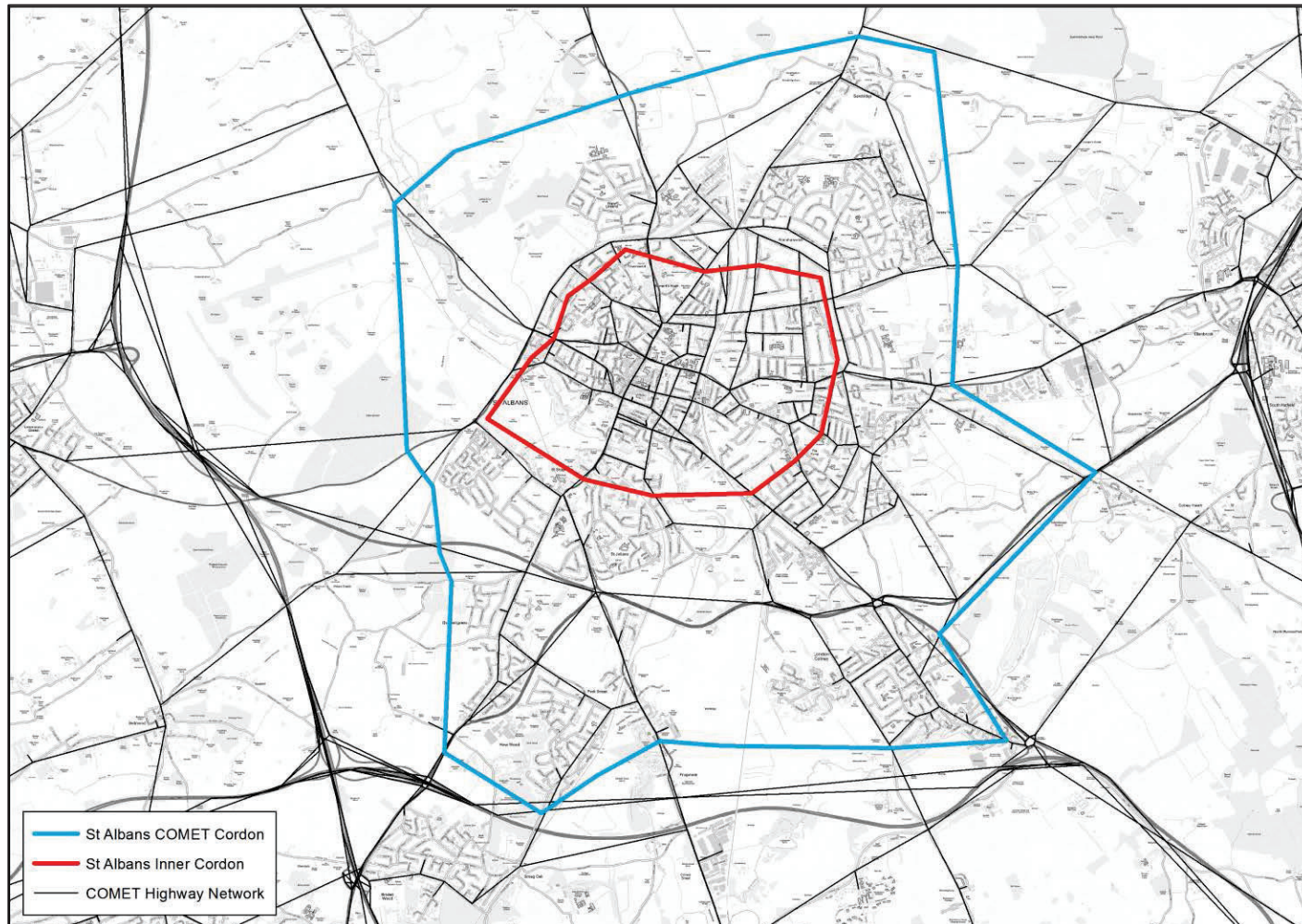
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Cordon / Screenline Definition

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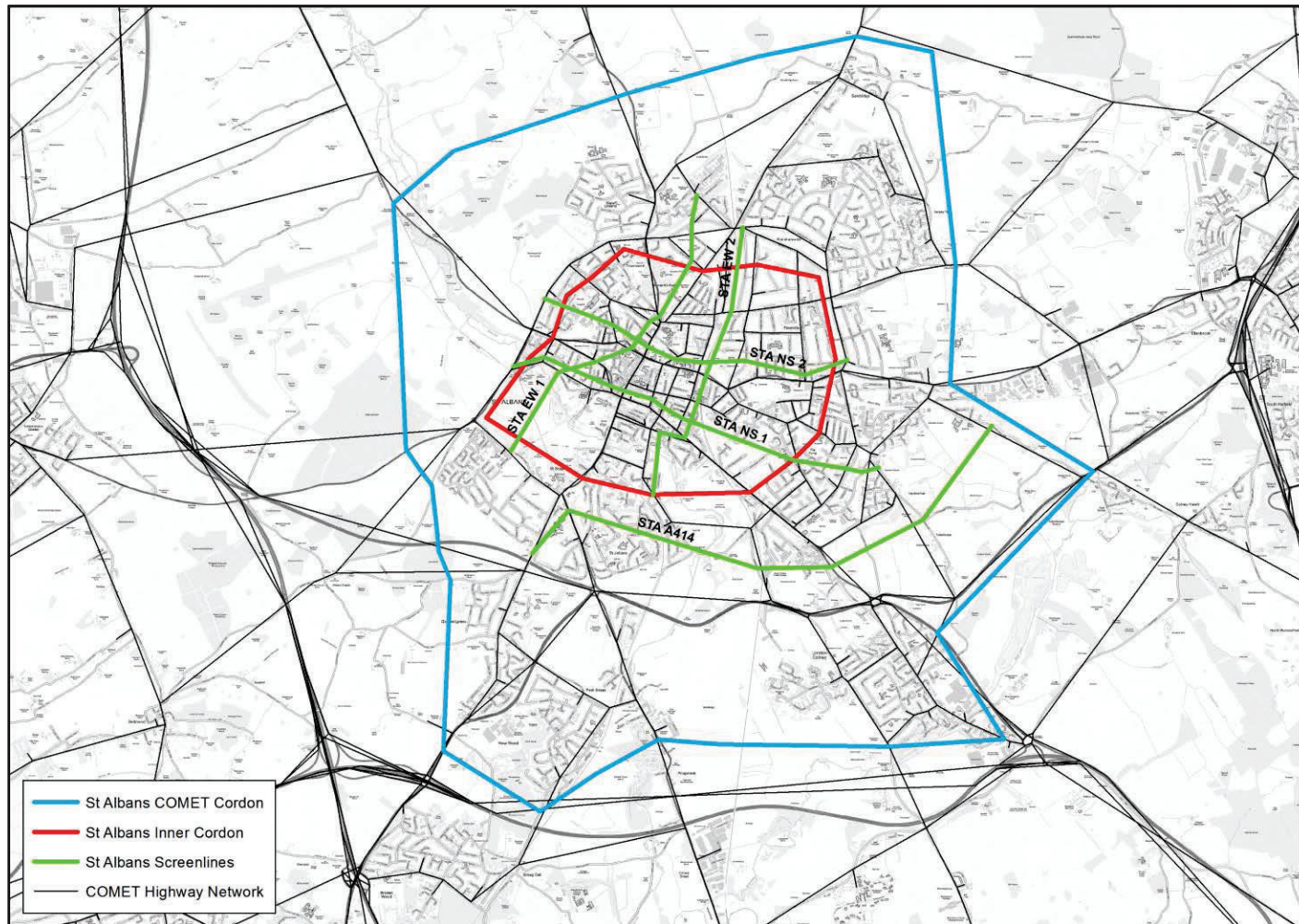
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Cordon / Screenline Definition

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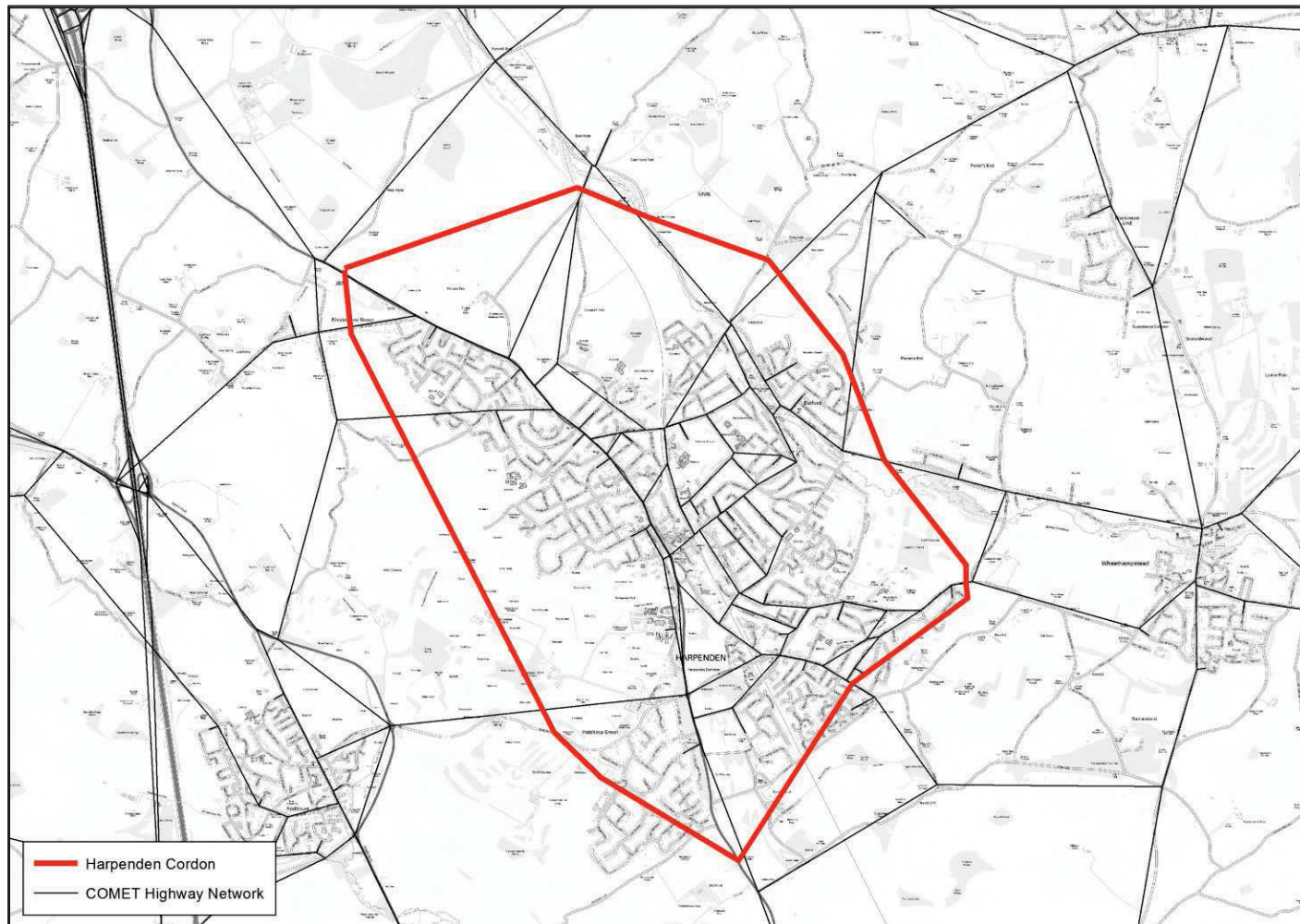
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Cordon / Screenline Definition

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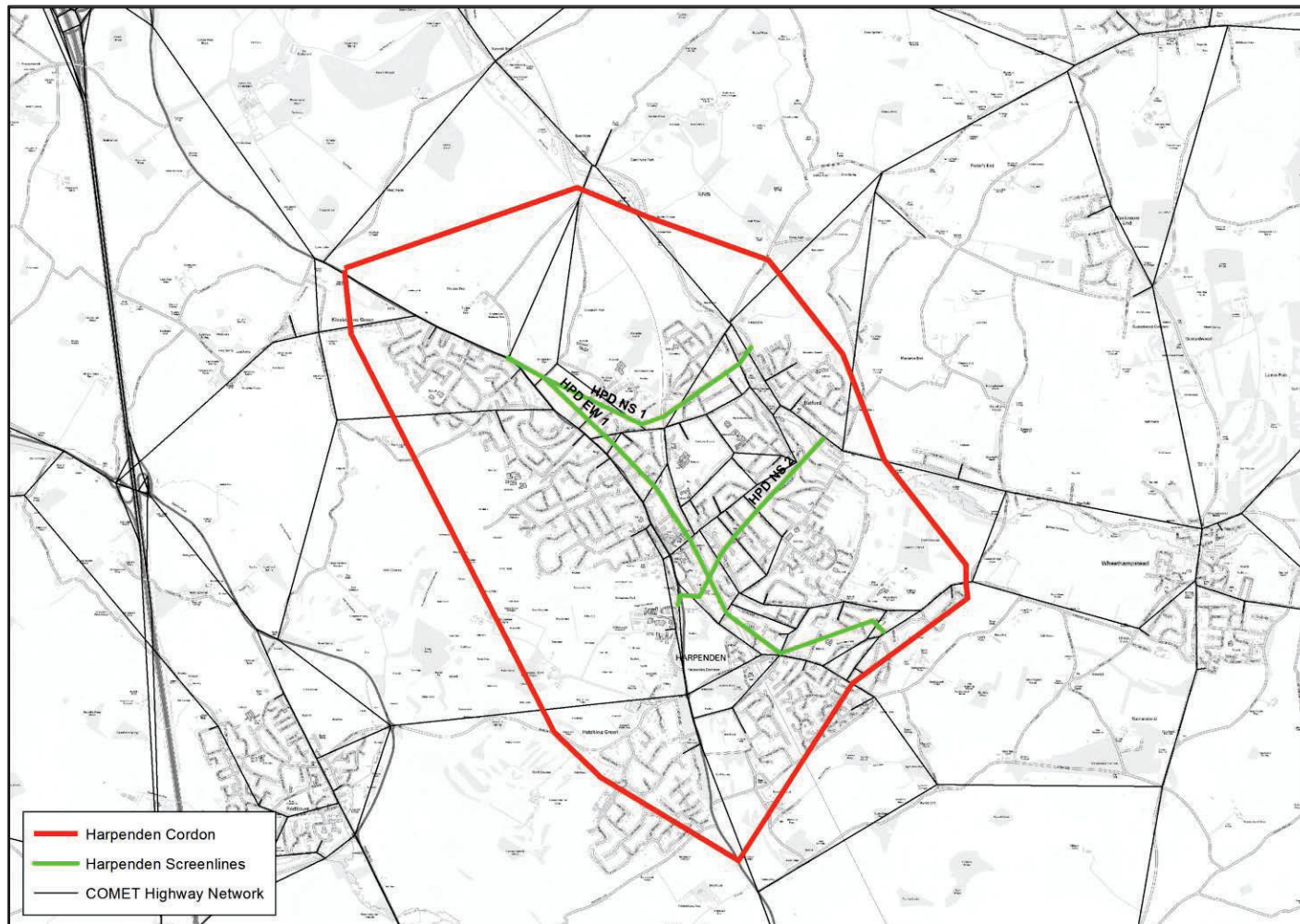
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Cordon / Screenline Definition

In addition to the existing COMET St Albans and Harpenden cordons, screenlines were defined to ensure movements were captured.

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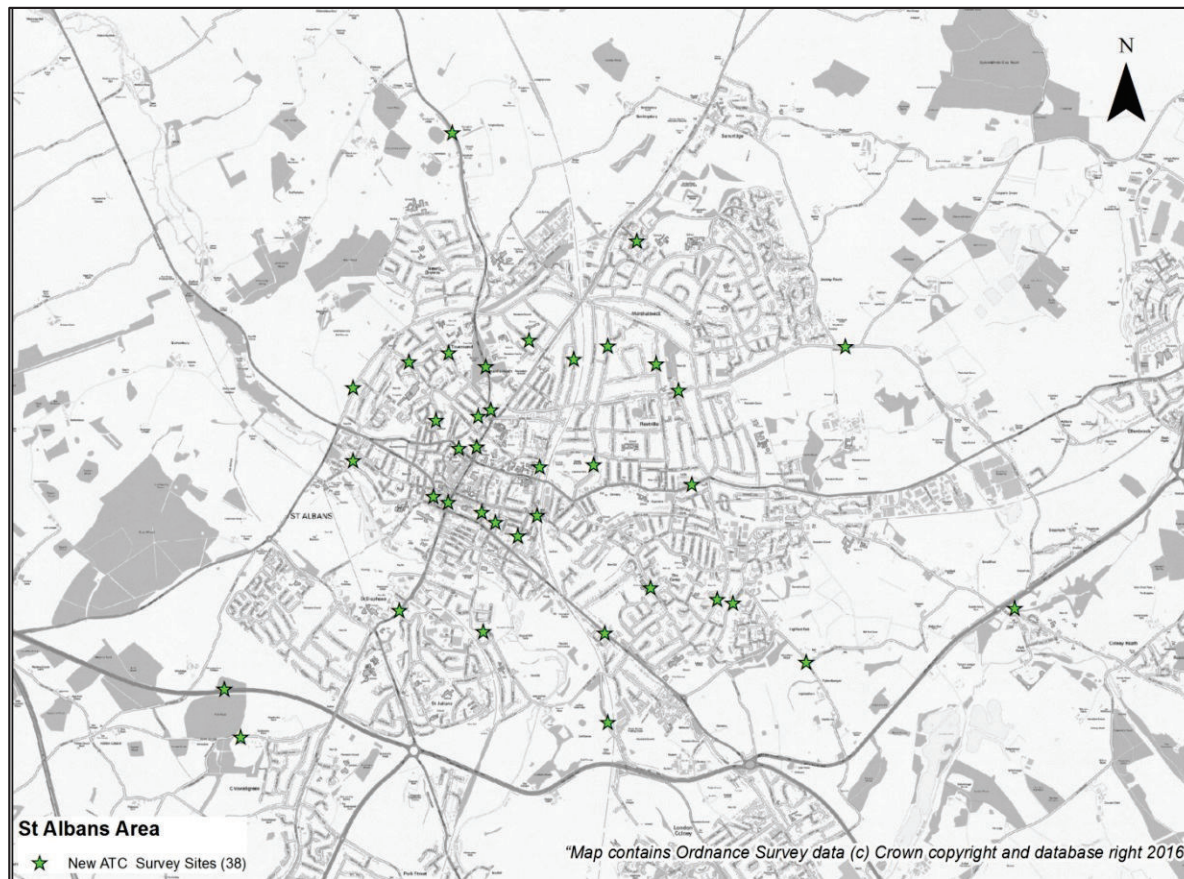
Data collection

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St Albans District Surveys

ATR commissioned to collect ATC, MCC and Bus Count Surveys in St Albans and Harpenden following a competitive tendering process. Surveys were undertaken in November 2016.

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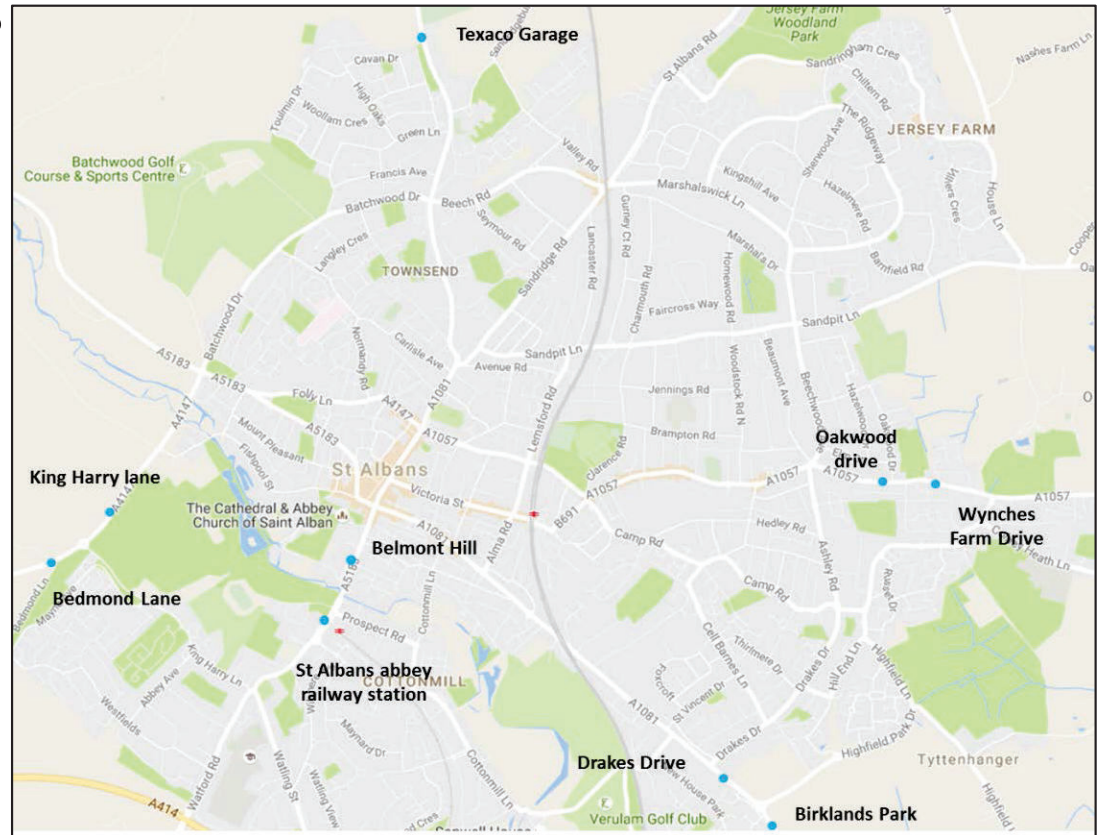


St Albans District Surveys

Data collected at 62 ATC locations and 14 MCC locations across St Albans and Harpenden.

Bus boarding and alighting data collected at pairs of bus stops and on St Peter's Street in central St Albans.

Historical data from 65 HCC count sites also used (more than 50% of all data used for highway calibration/validation).



St Albans District Surveys

- 2-week ATC / video MCC data collection starting from Monday 14th November
- Some data loss / corruption
 - Vandalism
 - Damaged tubes / waterlogging
 - Illegal parking on top of tubes
 - Data collection period extended to first week of December at some sites
- 1-day MCC and bus data collection undertaken on Tuesday November 22nd between 07:00 and 19:00. No issues reported.

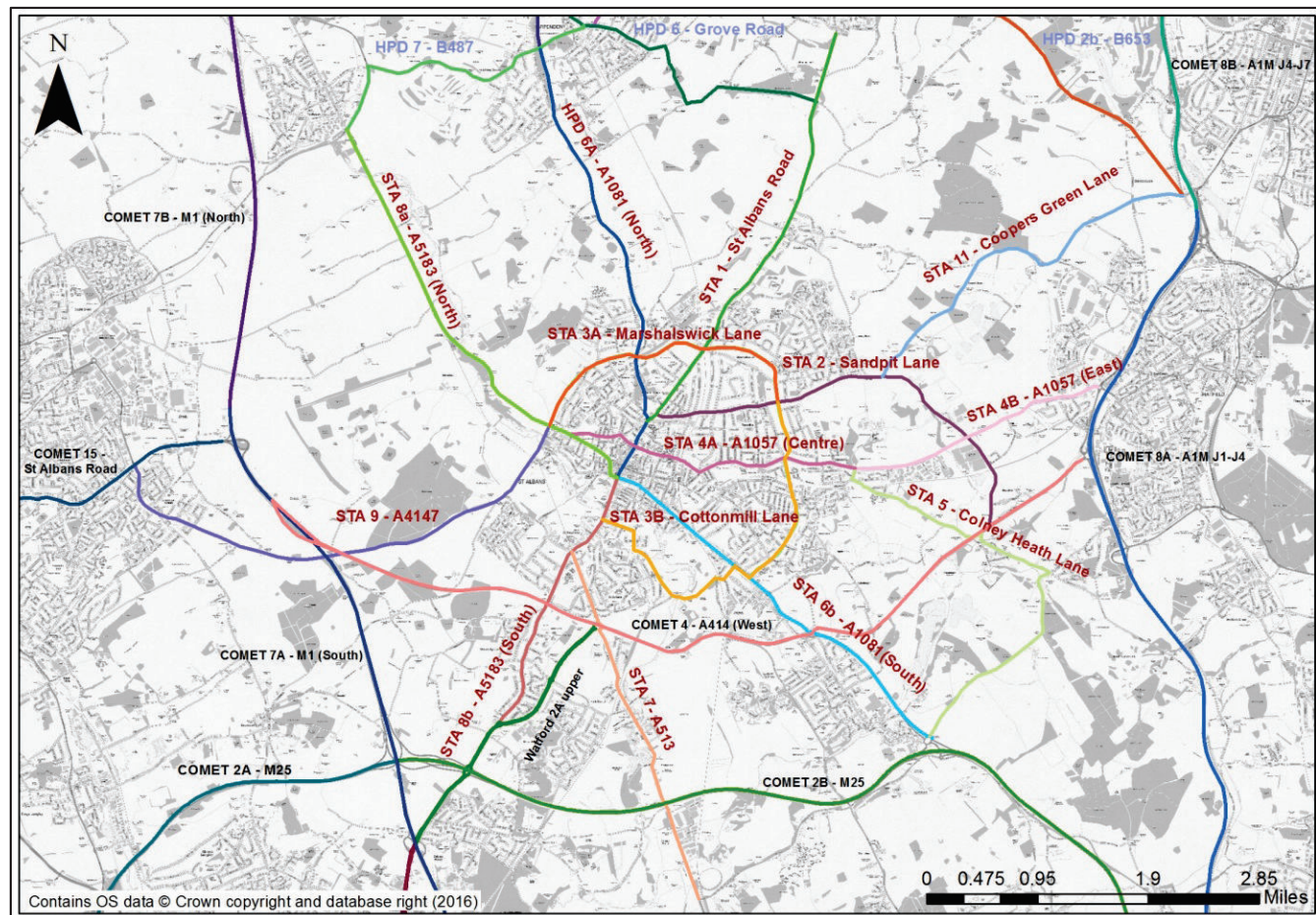
St Albans District – Journey Time Routes

– HCC data from TrafficMaster for academic year 2014/15

- Average journey times for weekdays only, excluding bank and school holidays
- AM peak (08:00-09:00), average IP (10:00-16:00) and PM peak (17:00-18:00)

Total of 22 new Journey Time routes in and around St Albans District identified.

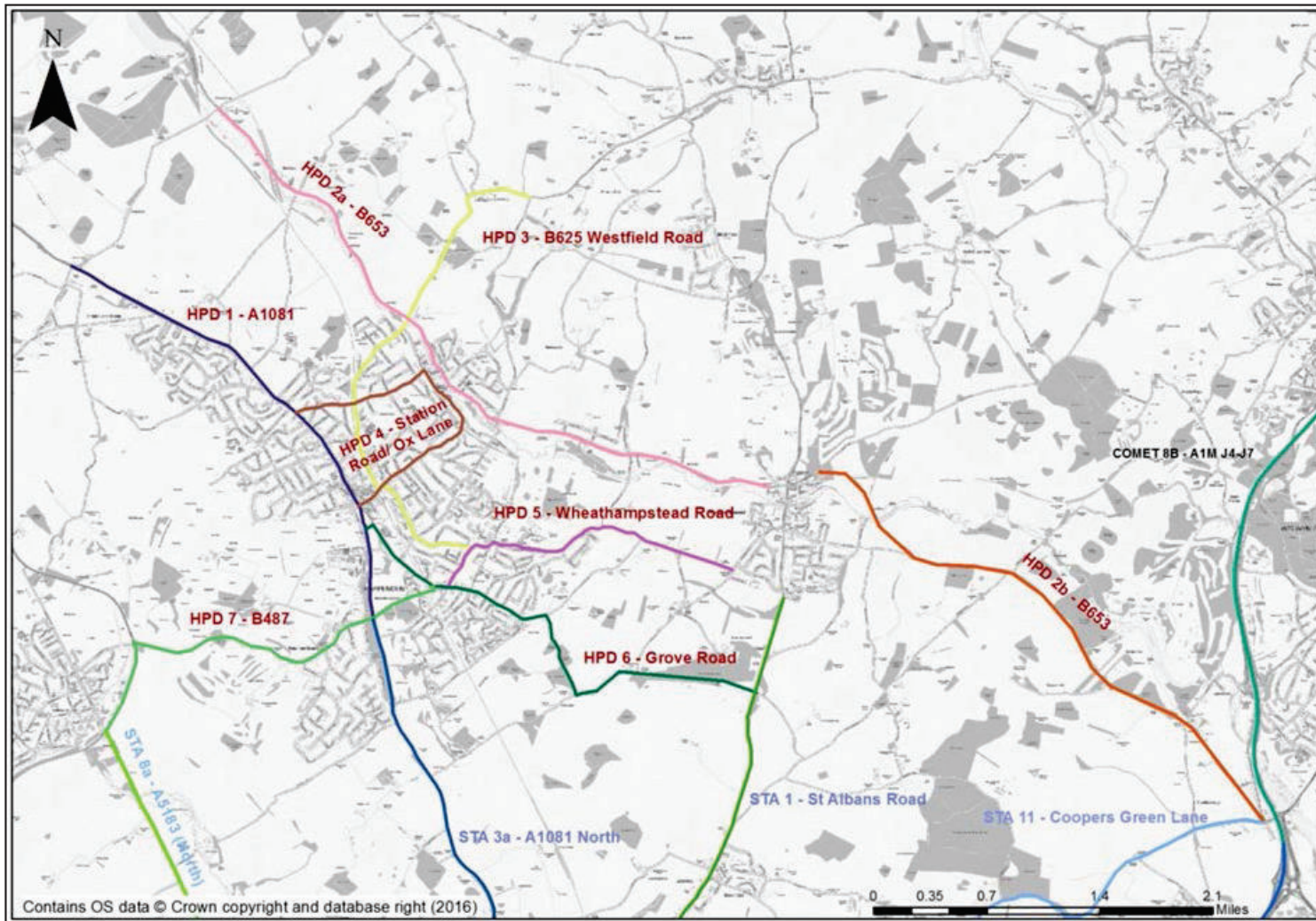
3 existing COMET routes also applicable.



St Albans District – Journey Time Routes

– Harpenden Journey Time routes defined:

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Base Year Calibration and Validation – Highway Model

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Summary of Calibration / Validation

- Updated data processing
 - Review of count & Journey Time data based on consistency & reliability
- Enhanced network
 - At COMET level: reviewed saturation flows, reviewed strategic roads based on main convergence / journey time validation issues
 - At St Albans level: reviewed limits of the St Albans urban area
- Post matrix assignment convergence (no. of iterations)

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	COMET V2	COMET V3
AM	34	44
IP	29	25
PM	35	30

Hertfordshire Results (the whole model area)

WebTAG Guidelines

From WebTAG Unit M3.1 Highway Assignment Modelling

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Table 1 Screenline Flow Validation Criterion and Acceptability Guideline

Criteria	Acceptability Guideline
Differences between modelled flows and counts should be less than 5% of the counts	All or nearly all screenlines

Table 2 Link Flow and Turning Movement Validation Criteria and Acceptability Guidelines

Criteria	Description of Criteria	Acceptability Guideline
1	Individual flows within 100 veh/h of counts for flows less than 700 veh/h	> 85% of cases
	Individual flows within 15% of counts for flows from 700 to 2,700 veh/h	> 85% of cases
	Individual flows within 400 veh/h of counts for flows more than 2,700 veh/h	> 85% of cases
2	GEH < 5 for individual flows	> 85% of cases

Table 3 Journey Time Validation Criterion and Acceptability Guideline

Criteria	Acceptability Guideline
Modelled times along routes should be within 15% of surveyed times (or 1 minute, if higher than 15%)	> 85% of routes

Post Matrix Assignment Results V3

(New St Albans District screenlines/cordons are not reported)

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COMET Results V2 Post ME			COMET Results V3 Post ME		
Screenline Summary			Screenline Summary		
Time Period	Lights	Total	Time Period	Lights	Total
AM	84%	87%	AM	87%	89%
IP	92%	92%	IP	95%	92%
PM	89%	89%	PM	87%	87%
All Counts (Calibration and Validation)			All Counts (Calibration and Validation)		
Time Period	Lights	Total	Time Period	Lights	Total
AM	62%	62%	AM	64%	64%
IP	71%	70%	IP	73%	73%
PM	58%	59%	PM	62%	62%

Lights = cars & lights goods vehicles

Total = all vehicles

The overall COMET (screenlines/cordons) results remained unchanged.

Post Matrix Assignment Results V3

(New St Albans District screenlines/cordons are not reported)

COMET Results V2 Post ME			COMET Results V3 Post ME		
Screenline Summary - Calibration			Screenline Summary - Calibration		
Time Period	Lights	Total	Time Period	Lights	Total
AM	96%	96%	AM	97%	97%
IP	100%	100%	IP	100%	100%
PM	100%	100%	PM	100%	100%
All Calibration (310 Counts)			All Calibration (337 Counts)		
Time Period	Lights	Total	Time Period	Lights	Total
AM	64%	63%	AM	65%	65%
IP	74%	72%	IP	74%	74%
PM	65%	64%	PM	66%	66%
Screenline Summary - Validation			Screenline Summary - Validation		
Time Period	Lights	Total	Time Period	Lights	Total
AM	50%	50%	AM	50%	63%
IP	64%	64%	IP	75%	63%
PM	43%	57%	PM	38%	38%
All Validation (143 Counts)			All Validation (114 Counts)		
Time Period	Lights	Total	Time Period	Lights	Total
AM	56%	56%	AM	61%	61%
IP	68%	64%	IP	68%	68%
PM	49%	48%	PM	48%	49%

St Albans cordon is converted to a Calibration Cordon to improve the results within and through St Albans.

The slight drop in PM screenline summary validation relates to 2 COMET screenlines dropping 1% overall to 6%.

Post Matrix Assignment Results V3

Journey Time (New St Albans routes are not reported)

	COMET V2	COMET V3
AM	74%	74%
IP	94%	86%
PM	70%	70%

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Guidance states modelled times along routes should be within 15% of surveyed times (or 1 minute, if higher than 15%). Historic journey time routes are largely unchanged. The reduction in IP relates to a route on the A505 dropping to 17%.

Routes around St Albans show good results with routes along the M1, M25 and A1 bordering St Albans District validating well. Issue remains along the A414 south of St Albans but noted Trafficmaster data is very variable.

Summary of COMET V3 Validation

- At screenline/cordon level
 - Pass WebTAG criterion (>85%) for total vehicles across all time periods
- At count level
 - Still below WebTAG criterion (>85%)
 - Small improvement compared to COMET v2 → some improvements to be considered in future work
- Journey time validation
 - Consistent results in AM and PM peak
 - IP reduction but not linked directly to St Albans work
- Conclusion
 - The enhancements in St Albans have not materially impacted the wider COMET model

St Albans District Results

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Post Matrix Assignment Results

(St Albans District Area screenlines/cordons)

Screenline Summary		
Time Period	Lights	Total
AM	81%	73%
IP	92%	92%
PM	77%	73%

All Counts (Calibration and Validation)		
Time Period	Lights	Total
AM	71%	71%
IP	89%	89%
PM	73%	73%

Lights = cars & lights goods vehicles
 Total = all vehicles

Screenline summary figures include the dual use of the St Albans Cordon to track movements both into and out of St Albans in it's entirety, but also on its western and eastern sides between Hemel Hempstead/Hatfield and St Albans.

Post Matrix Assignment Results

(St Albans District Area screenlines/cordons)

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Screenline Summary - Calibration		
Time Period	Lights	Total
AM	95%	90%
IP	95%	100%
PM	80%	75%

All Calibration (173 Counts)		
Time Period	Lights	Total
AM	73%	73%
IP	92%	92%
PM	75%	75%

Screenline Summary - Validation		
Time Period	Lights	Total
AM	25%	0%
IP	50%	50%
PM	50%	50%

All Validation (26 counts)		
Time Period	Lights	Total
AM	62%	58%
IP	69%	69%
PM	58%	58%

The validation results are from 2 screenlines – one each in St Albans and Harpenden. AM results are low but actual percentage differences are -6% and 7% on two screenlines.

Results from individual validation counts are similar to those seen across COMET.

Post Matrix Assignment Results

(St Albans District Area screenlines/cordons)

During the Matrix Estimation process, we undertook a further test where all counts were converted to calibration. The results indicated:

- Improvements in the screenline results
- Individual sites remain relatively steady

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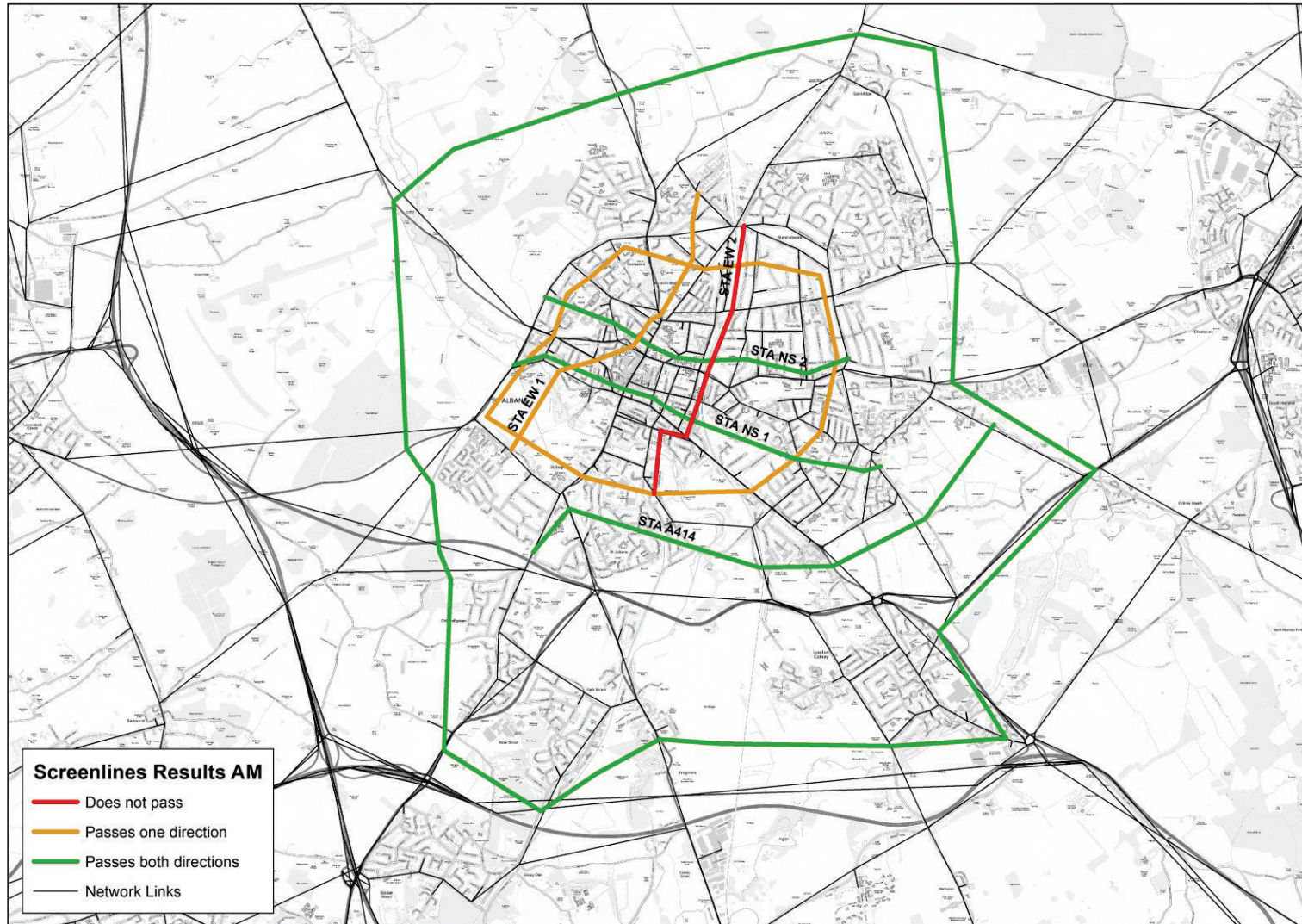
Interim Results			Interim Results with All Counts as Calibration		
Screenline Summary (calibration & validation)			Screenline Summary (all calibration)		
Time Period	Lights	Total	Time Period	Lights	Total
AM	73%	73%	AM	89%	82%
IP	88%	81%	IP	100%	96%
PM	73%	73%	PM	79%	82%
All Counts (Calibration and Validation)			All Counts (Calibration)		
Time Period	Lights	Total	Time Period	Lights	Total
AM	67%	67%	AM	68%	66%
IP	87%	87%	IP	90%	88%
PM	71%	71%	PM	75%	74%

These results indicated that the model is unable to calibrate flows at individual sites. This indicates that the results are stable given the observed data used as the model can not amend flows to match the observed data. This highlights conflicts between sites and the quality of the observed data.

St Albans Screenlines

AM St Albans

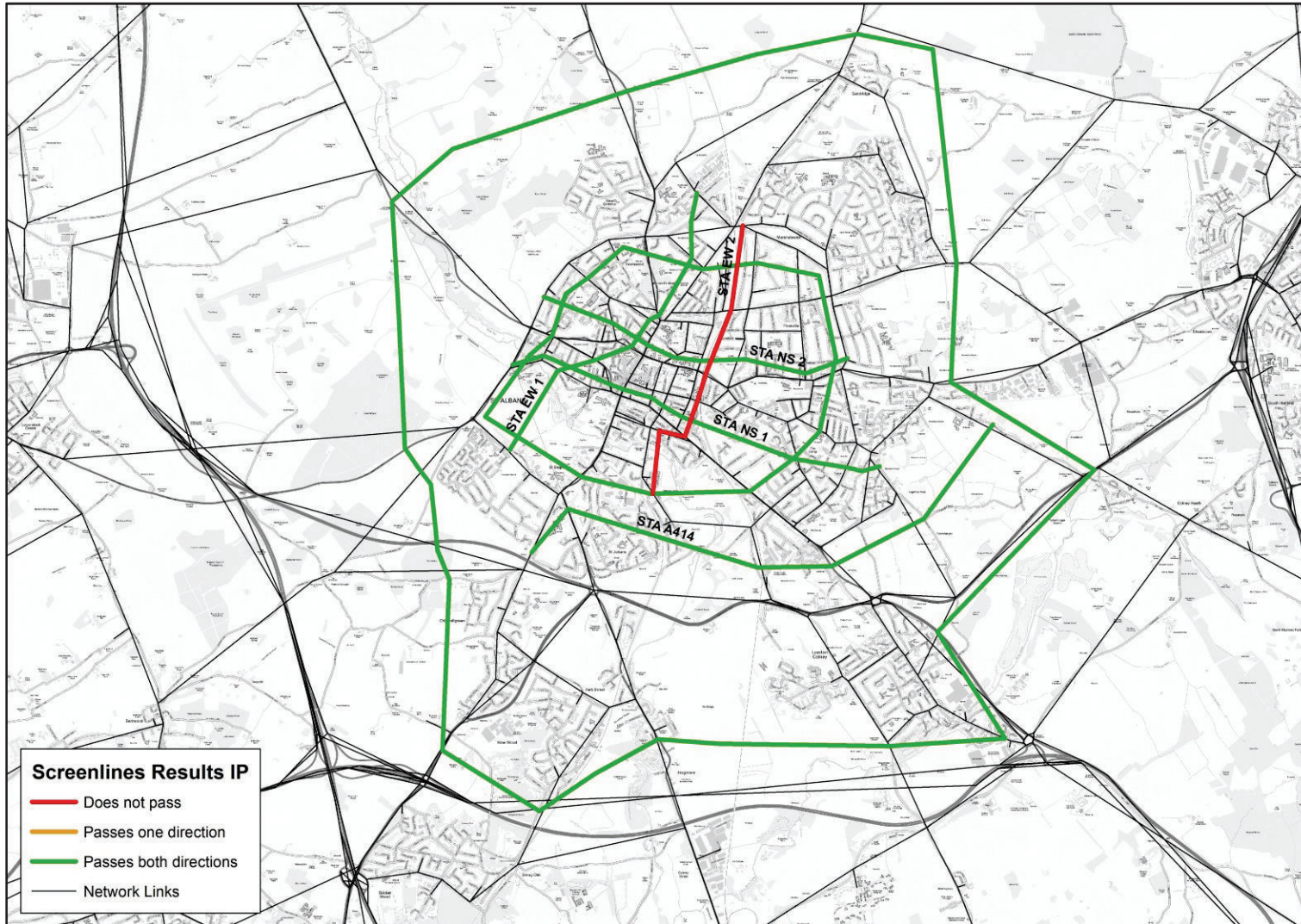
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St Albans Screenlines

IP St Albans

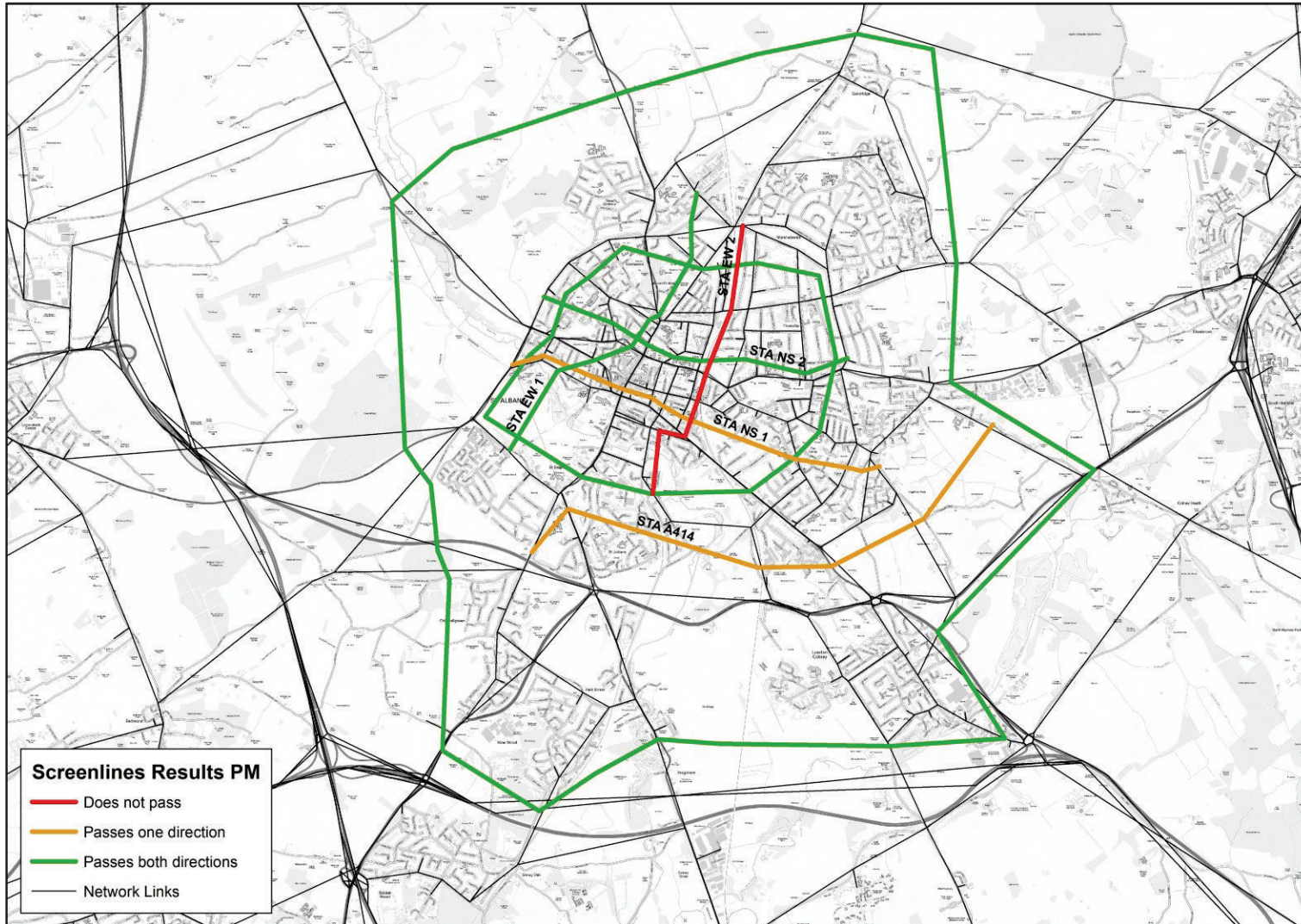
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St Albans Screenlines

PM St Albans

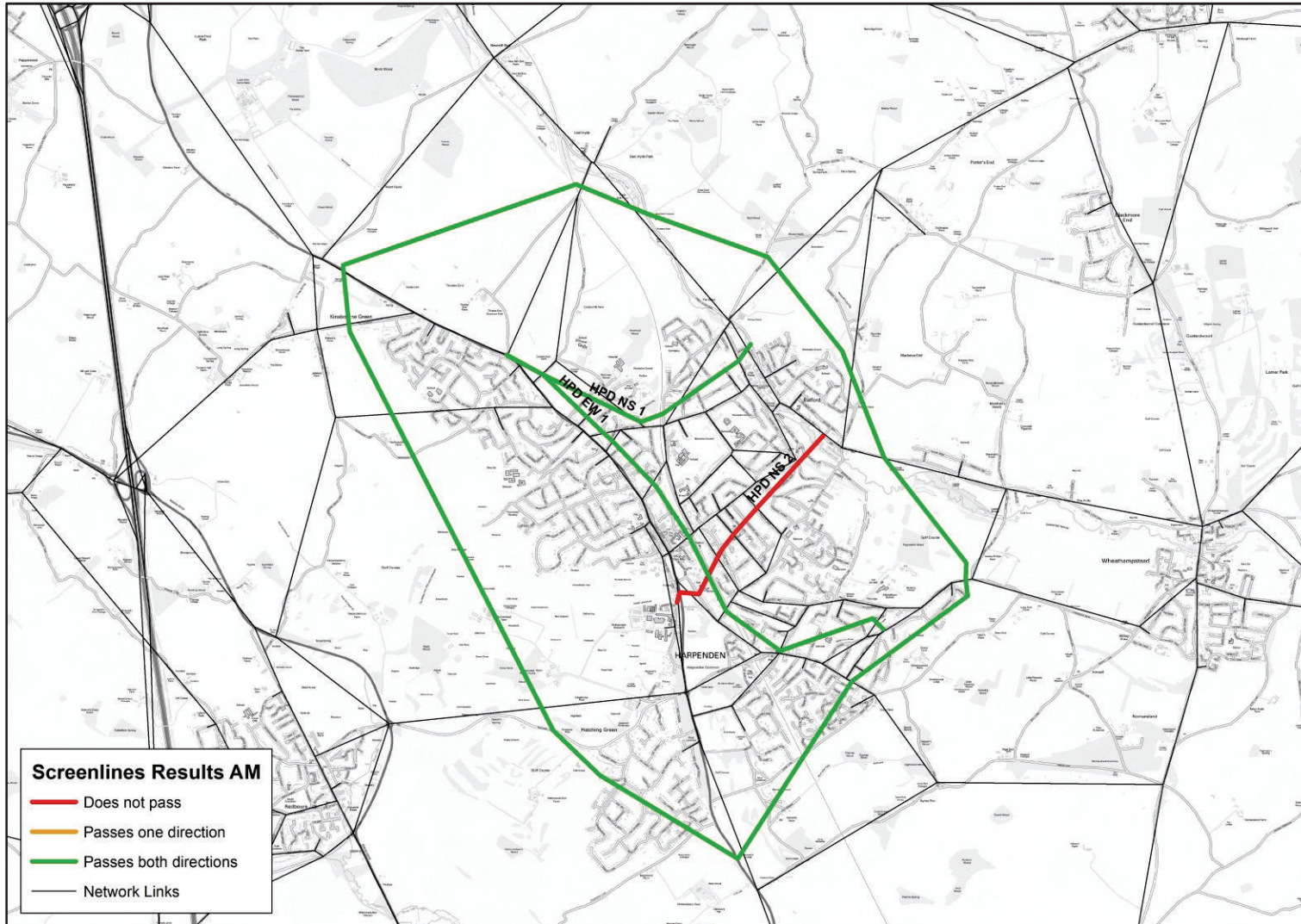
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St Albans Screenlines

AM Harpenden

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St Albans Screenlines

IP Harpenden

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