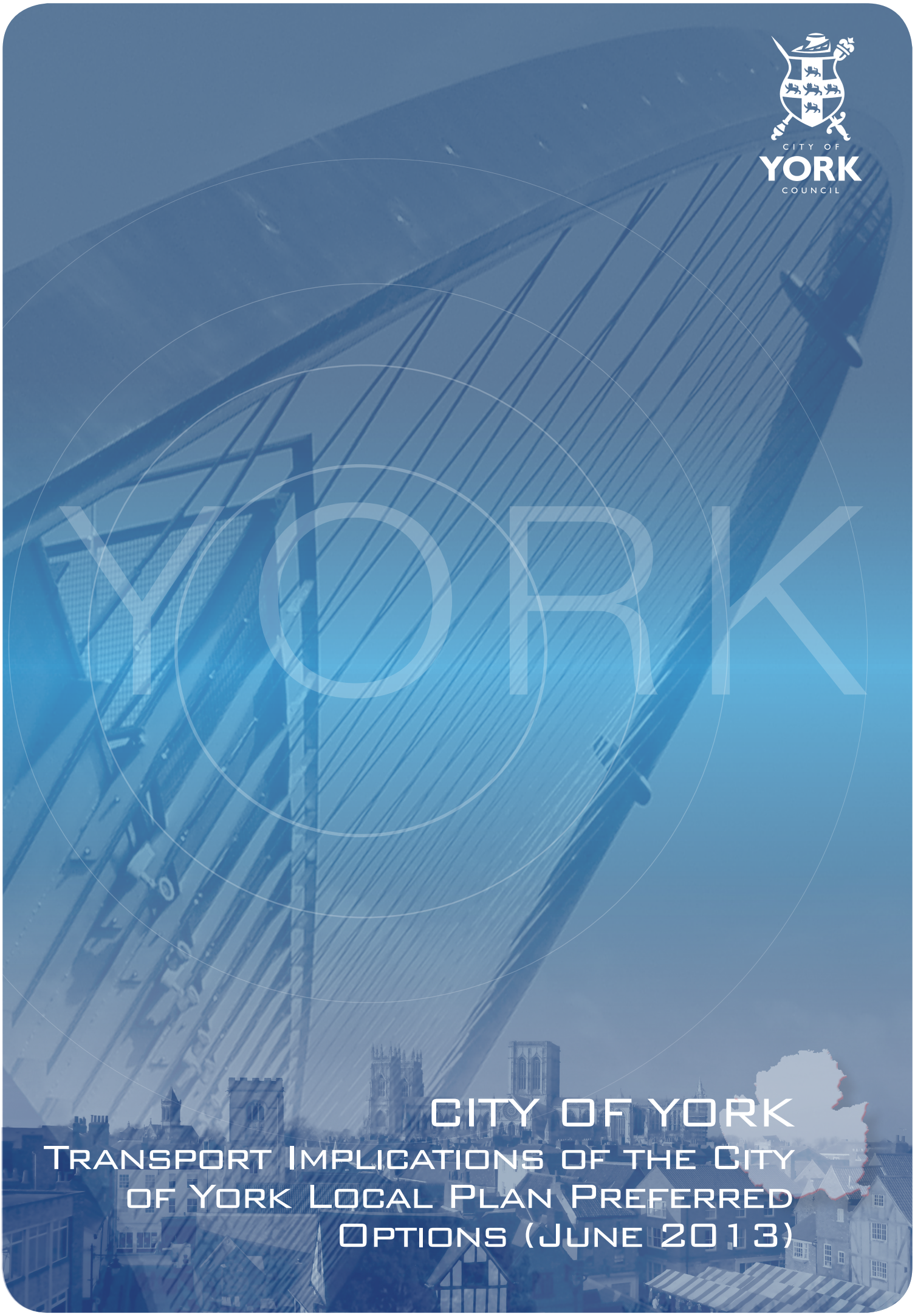


CITY OF YORK

TRANSPORT IMPLICATIONS OF THE CITY OF YORK LOCAL PLAN PREFERRED OPTIONS (JUNE 2013)

Contents

Summary

1. This paper presents the analysis of the implications for transport arising from the proposed growth assumptions within Local Plan Preferred Options document. It then considers the investment in transport infrastructure and other measures that would be necessary to support the projected growth in employment and housing. In particular it:

- Considers the potential congestion delay impacts of a 'reference case', consisting of the traffic demands arising from the planned housing and employment growth rates and a package of transport measures that can, with a reasonably high degree of confidence, be deemed to be deliverable.
- Gives a more detailed description of the implications of the 'reference case'.
- Considers further transport infrastructure and other transport measures that might be put into place, albeit with a reduced degree of confidence, to achieve a lower level of congestion delay compared to the 'reference case' .

2. The paper updates the Topic paper on the transport implications of the LDF, September 2011. It also updates the later Supporting Paper 9 – Transport Implications of the LDF, 2012 that was prepared in support of the Local Development Framework Core Strategy, submitted for Examination in Public in February 2012 (and subsequently withdrawn in August 2012). This paper should be read in conjunction with those preceding documents.

3. The key outcomes from the analysis are:

- For the 'Reference Case' congestion delay across the transport (highway) network could rise to over two-and-a-half times the current delay over the plan period.
- In addition to the general increase in congestion delay across the network the traffic demand on some parts of the network (e.g. particular links or junctions) will either reach or exceed the theoretical (or actual) capacity of that part of the network
- Investment in transport infrastructure over-and-above that identified in the 'reference case' is likely to achieve a lower level of congestion delay.
- Investment in other 'softer' transport measures in addition to investment transport infrastructure is likely to help in achieving a lower level of congestion delay.

Background

The need to assess the impacts

4. Future growth in employment and housing in York will generate a substantial increase in the number of vehicular trips, placing additional demands on an already congested transport network. Because of this, and the limited space available for providing additional road capacity, options that enable sustainable access to developments should be promoted.

Existing Traffic Levels in York and how York compares with other places

5. Congestion levels in key areas of the city are already high, with traffic on the Inner Ring Road, key radials and the northern outer ring road experiencing significant delays at peak travel times. The most recently reported figures for area-wide traffic mileage in York, contained in the Local Transport Plan 2006-2011 Mid-Term Report[1] show that traffic levels in the a.m. peak period have remained fairly consistent, with a slight downward trend, since 1998/99. More recent data from automatic traffic counters in the city show this slight downward trend continuing.

6. The City of York Local Transport Plan 2006-2011 (LTP2) states that, according to 2001 Census data, York is a net 'importer' of approximately 5,000 commuter trips per day (22,455 in 17,199 out and 70,098 within), an increase of 65% from 1991. The majority of 'external' trips consist of movements to or from the neighbouring authority areas, particularly the East Riding of Yorkshire, Leeds and Selby.

7. The most useful indicator for benchmarking York's performance against 'comparable' towns and cities is the former National Indicator **NI167** Congestion – average journey time per mile during the morning peak (also LTP2 indicator 6C). However, there are several variants to this, with authorities able to choose which one to use. City of York Council is one of the 28 authorities using Variant 2[2]. Table 1 shows the delay time and ranking for York in relation to 'benchmarking' authorities within the 28 using Variant 2, in 2008/09, together with an approximate comparison to some other authorities using other variants. Taking into account the highly constrained nature of the highway network, it could be argued that congestion in York is not excessive at present, although this may be contrary to public opinion.

Table 1 NI167 Congestion – average journey time per mile during the morning peak benchmarking results

Authorities using Variant 2		
Authority	2008/09 delay time	Ranking (out of 28)
Warrington	3 mins. 12 secs.	8
York	3 mins. 19 secs.	9
Brighton and Hove	3 mins. 26 secs.	15
Kingston-upon-Hull	3 mins. 55 secs.	19
Cambridgeshire	4 mins. 12 secs.	25
Oxfordshire	4 mins. 14 secs.	28
Authorities using other Variants		
Chester and West Cheshire (Variant 3)	2 mins. 3secs	n/a
Leeds (Variant 1)	3 mins. 55 secs.	n/a

[1] City of York Council Local Transport Plan 2006-2011 Mid-Term Report: Taking on the transport challenges in York, December 2008

[2] NI 167b: Variant 2 - Vehicle journey time per mile during the morning peak on major inbound routes in the larger urban centres, weighted by the relative traffic flow on those different routes .

Cost of congestion

8. Nationally, in 1995, it was reported that congestion cost the British economy £15 billion per year[3] and could reach £30 billion per year by 2010[4]. The Eddington Transport Study[5] stated *that 'Eliminating existing congestion on the road network would be worth some £7-8 billion of GDP per annum.'* adding that '*If left unchecked, the rising cost of congestion will waste an extra £22 billion worth of time in England alone by 2025.*' A reasonable estimate of the current cost of congestion in the UK is somewhere in between these values and could be assumed to be approximately £20 billion per year. The 'Wider costs of Transport in English Urban Areas in 2009' report indicated that excess delays cost £10.9 billion but there were also additional comparable costs due to environmental and safety impacts.

9. At the local level, the Eddington Transport Study stated the A1237 York Northern Outer Ring Road had between 27,670 and 139,400 lost hours per link kilometre due to congestion. In addition, the Topic paper on the transport implications of the LDF, September 2011, estimated the cost of congestion at £37 million per year (2008 baseline), based on modelling work undertaken at that time.

Links with LTP3[6]

10. The Local Plan and LTP3 are inextricably linked, as the future housing and employment rates form the crucial element in setting the long-term scenario for LTP3. Conversely, the deliverability of the strategy and actions within LTP3 will determine to a large extent how (and how well) the Local Plan strategy is realised.

Assessment methodology

11. The city's SATURN strategic transport model and CUBE demand model have been used to determine the impact of the development projections on the highway network over the 15-year plan period. To represent this a base year of 2011 and a target year of 2031 have used as proxies for the envisaged 2014/15 start year and 2029/30 end year for the plan. It models the City of York authority area at the highest level of detail, generating trips rates based on the level of development to calculate traffic flows. Beyond the York authority area a topographically correct buffer network covering all the north of England is modelled, and beyond this the remainder of the country is also modelled, to lesser topographic detail. In both of these cases traffic growth is calculated using TEMPro[7].

12. The demand model models modal change (to public transport) arising from fundamental changes to public transport provision (e.g. faster services and new routes).

13. To allow the large scale developments such as housing proposals at Heslington South, Clifton Moor and Monks Cross, to access the wider modelled network it was necessary to model extra links, over and above the 'reference case' network (which

[3] 'Moving forward – a business strategy for transport' CBI 1995
[4] The economic costs of road traffic congestion, ESRC Transport Studies Unit, 2004
[5] The Eddington Transport Study, The Case for Action: Sir Rod Eddington's advice to Government,. 2006
[6] City of York's Local Transport Plan 2011 – 2031 (LTP3), 2011
[7] TEMPro (Trip End Model Presentation Program) software are used for transport planning purposes.

includes the infrastructure improvements listed in paragraph 15). This was also the case for the new employment at Monks Cross. These were indicative links only, simply to test the effect of the development on the network.

14. The model used three different sized cordons, so the effects of the development and infrastructure, in terms of average speed, delays etc. can be studied in different areas. These were as listed below and shown in Figure 1 to Figure 3:

- The Inner Ring Road and Water End;
- Within the confines of the Outer Ring Road;
- The CYC boundary

Figure 1: Inner Ring Road and Water End Cordon

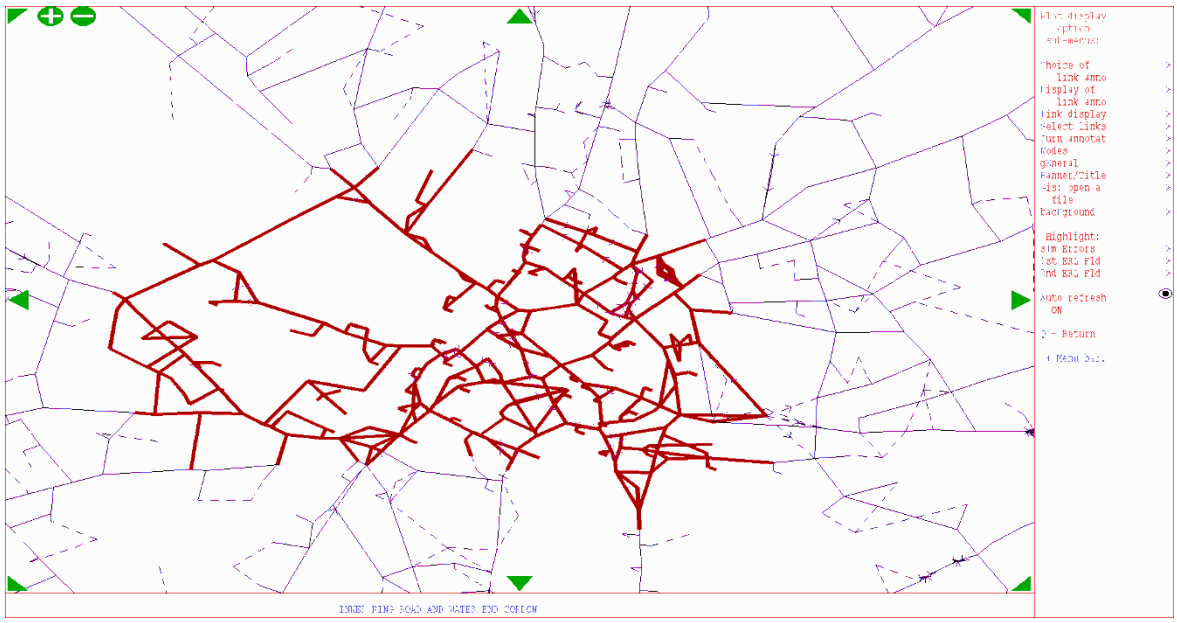


Figure 2: Within the Outer Ring Road Cordon

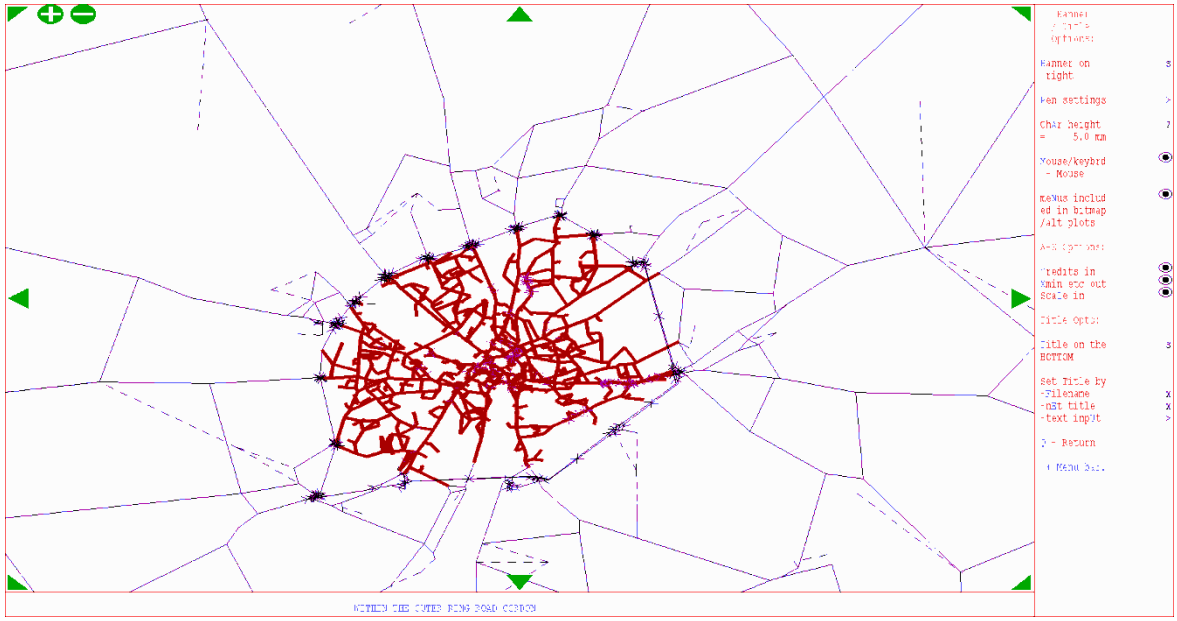
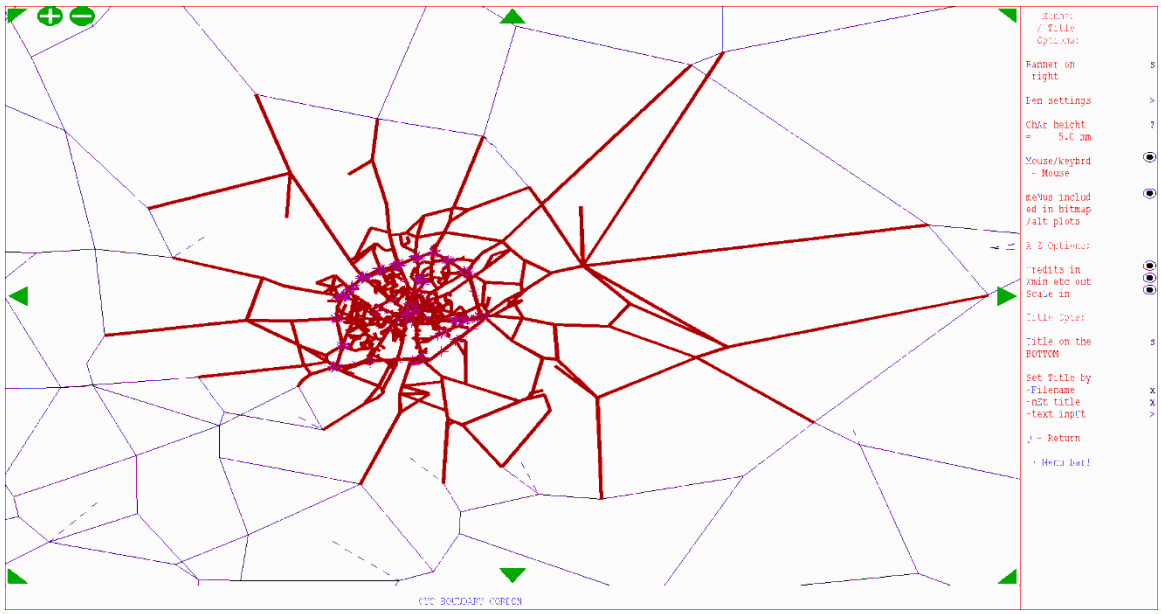


Figure 3: CYC boundary Cordon



15. Limitations to the (combined SATURN and CUBE) model, as applied,include:

- It does not explicitly model walking and cycling;
- it does not fully take into account any decisions of whether to not make a trip or to change the time when a trip is made (peak spreading),
- trip elasticities (i.e. the propensity to change modes) for car users may not reflect the impacts of increased congestion in the future, as these may change if congestion increases substantially.
- it makes broad assumptions for proposed connections to the network from new development (specific junction details are not modelled).

16. Therefore, the model models a 'worst case scenario' to indicate where issues might arise and for testing of mitigation options.

17. Future trip generation rates are based on the Local Plan employment and housing growth targets of 1000 jobs per annum (average) and 1090 dwellings per annum (average).

The 'reference case' assessment

Improvements and interventions included

18. The reference case includes improvements or interventions that are programmed, committed, or confirmed, or have a reasonable prospect of being delivered within the plan period. These include:

- **Access York, Phase I -** comprising one relocated/expanded and one new Park & Ride site, plus improvements to the A59/A1237 junction and bus priority on A59.

- **James Street Link Road, Phase II -** Delivery of the scheme is currently dependent on the development of a key site in the Foss Basin area.
- **Improvements to junctions (including approaches) on the A1237**
- **A new railway station at Haxby.**
- **A new Park & Ride site at Clifton Moor** (B1363 Wigginton Road) with associated bus priority measures on Wigginton Road
- **Junction improvements and other highway enhancements** to improve public transport reliability
- **'Priority route measures' on the inner ring road** providing greater priority for public transport and active forms of travel and enabling improvements to public spaces.

19. The cost of the Improvements and interventions in the reference case is estimated at £90 million: A further breakdown of these costs is contained in the Infrastructure Delivery Plan.

Results

20. The network summary statistics for each cordon comparing the 2011 Base and the 2031 Reference Case are shown in Table 2 to Table 4

Table 2: Network summary IRR and Water End Cordon

	AM		
	2011	**2031**	**% Difference**
Travel Time (pcu/hrs)	1413.2	2238.5	58.40%
Travel Distance (Pcu/kms)	20792.3	25723.2	23.72%
Average Speed (kph)	14.7	11.5	-21.77%
Delays (pcu/hrs)	728.2	1393.1	91.31%

Table 3: Network summary Within the Outer Ring Road Cordon

	AM		
	2011	**2031**	**% Difference**
Travel Time (pcu/hrs)	4116.2	6639	61.29%
Travel Distance (Pcu/kms)	90614.1	119089	31.42%
Average Speed (kph)	22	17.9	-18.64%
Delays (pcu/hrs)	1503.5	3217	113.97%

Table 4: Network summary CYC Boundary Cordon

	AM		
	2011	**2031**	**% Difference**
Travel Time (pcu/hrs)	9698.2	15395	58.74%
Travel Distance (Pcu/kms)	416973.9	498411.5	19.53%
Average Speed (kph)	43	32.4	-24.65%
Delays (pcu/hrs)	2241.5	6041.5	169.53%

21. The CYC Boundary Cordon results show the greatest changes. This is due to the inclusion of the Outer Ring Road within this cordon, to where a significant proportion

of traffic diverts, following increased levels of congestion in the city and it is also where major new developments such as Heslington South and Clifton Moor are in close proximity. Therefore, the CYC Boundary Cordon figures that are used for comparison purposes elsewhere in this report**.**

22. The results of the 'reference case' assessment are shown in Table 5.

Table 5 'Reference Case' network predictions [a]

Indicator	2011 Base (as proxy for 2014/15)	2031 (as proxy for 2029/30)
Flows (passenger car units per hour)	32,533	45,778
Modelled growth in flow (multiplier)	1.00	1.41
Total network delay (Hours)	2242	6042
Delay multiplier	1.00	2.70
% of Trip spent delayed	23%	39%
All Inbound Radial Routes[b]		
Travel Time (mins)	127.06	165.04(+30%)
Average Speed (km/hr)	28.95	22.26(-23%)
All Orbital Routes[c]		
Travel Time (mins)	121.95	148.58(+22%)
Average Speed (km/hr)	43.28	35.46(-18%)

Notes
a. Employment and housing growth rates 1000 jobs and 1090 dwellings per annum respectively.
b.Commencing outside of the ORR).
c. A1237, A64, IRR and Water End to Clifton Green

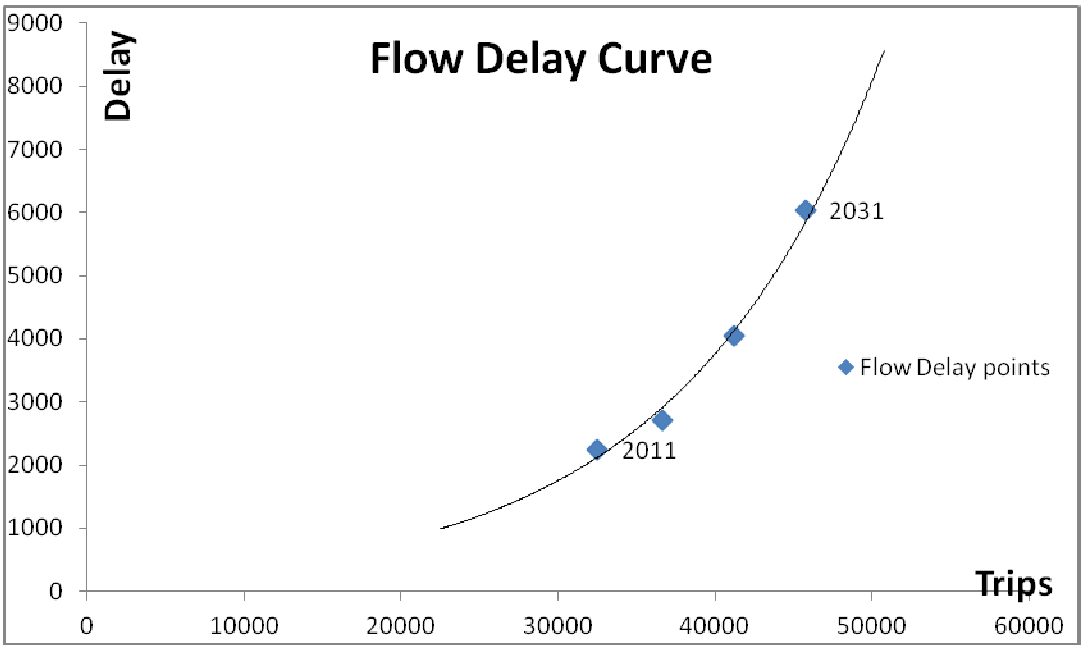
Implications

23. From Table 5 it can be seen that:

- The increase in delay is not directly proportional the increase in flow
- By 2031 (as a proxy for 2029/30) the delay across the network could be approaching three times the current delay.
- The multipliers for congestion 'cost' could be similar to those for delay

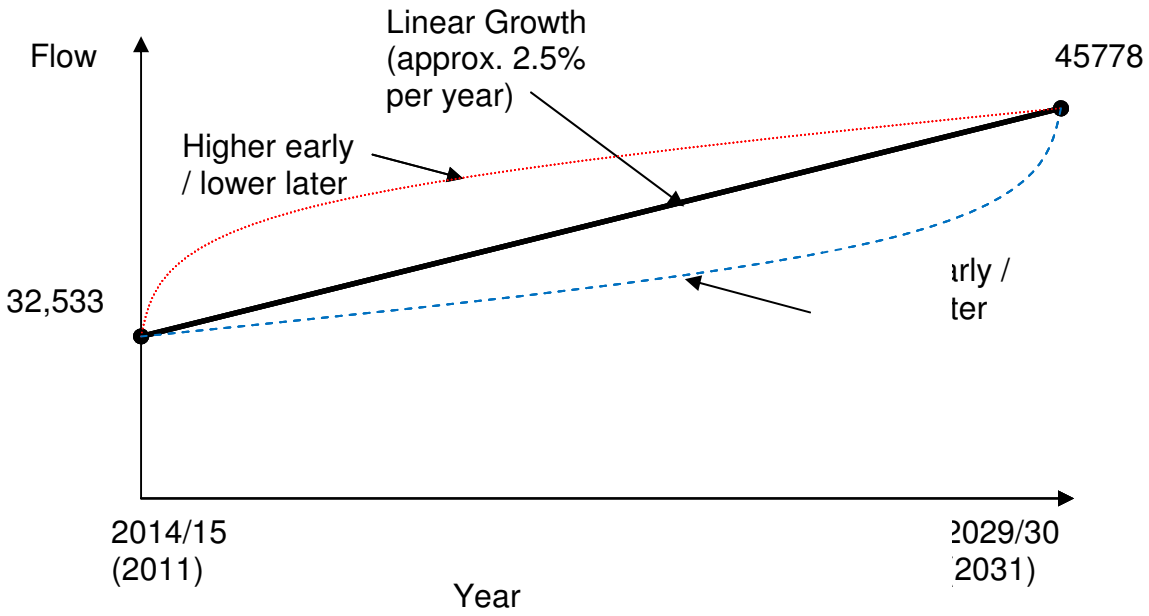
24. Figure 4 shows the level of delay related to the number of trips, with the two modelled years of the base, 2011, and the Reference Case, 2031. Intermediate points have been derived as a proxy for intervening years that have not been explicitly modelled. This has been done by factoring down the 2031 matrix by 10% and 20% respectively. In reality though, the delays at intervening years can only be more accurately determined by knowing either the proposed delivery trajectories or the actual timelines for development and highways infrastructure over the plan period

Figure 4: Flow Delay Curve



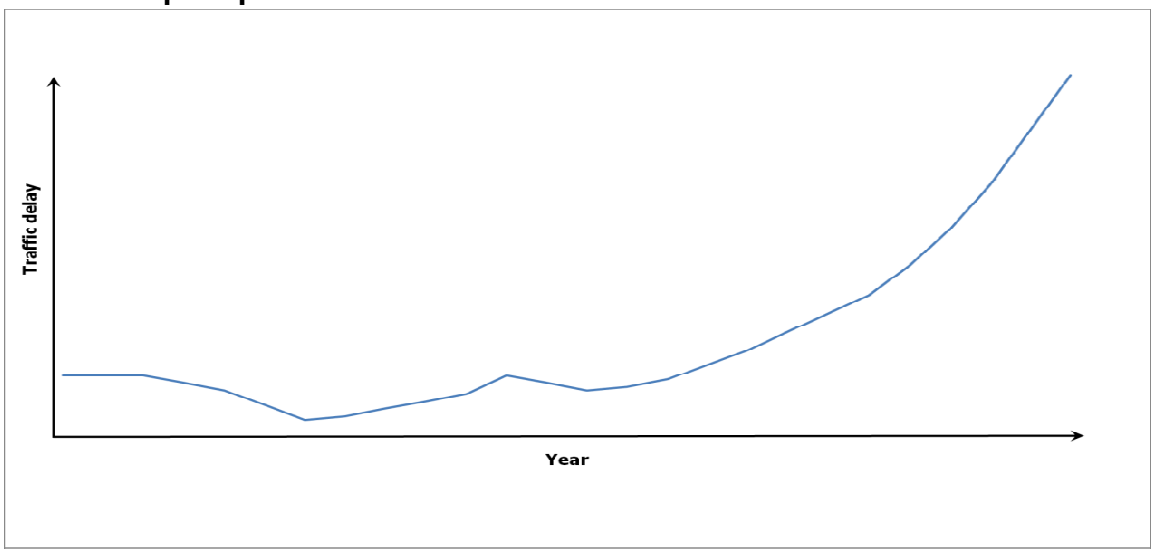
25. Table 5 shows the predictions for delay across the network in 2031, but not, at present, for intervening years. This is because, although a broad phasing for development has been set in the Local Plan, the more detailed growth trajectories have yet to be determined. An indication of the potential variations around the average (linear) increase in traffic flow is shown in Figure 5. Greater clarity on the 'shape' of the increase in traffic flow over the plan period will emerge as the plan is progressed.

Figure 5 'Reference case' - increase in traffic flow over the plan period



26. In addition, due to the non-linear relationship between traffic flow and congestion delay, the traffic flow figures for intervening years in the plan period will need to be predicted to devise a 'flow / delay curve' (see also paragraph 21 and Figure 4) to determine the delay at any year in the plan period. However, this is further complicated by the transport infrastructure or other transport intervention being implemented at discrete points in time over the plan period. Therefore, presently, it is only possible to give an indicative 'picture' of how congestion delay will change over the plan period. This is shown in Figure 6 and it can be seen from this that transport interventions tend to kick-down delay, whereas new development tends to increase delay. This figure will be updated and refined as the plan is progressed.

Figure 6 'Reference case' - indicative change in congestion delay over the plan period



27. It is likely that traffic levels in York will rise, irrespective of the amount of development that takes place, as personal wealth and the propensity for car ownership increases. The Department for Transport (DfT) has predicted traffic growth at a national level and this is replicated in Figure 7. Using this forecast, Figure 8 shows the indicative delay 'picture' based on national growth compared to the reference case.

Figure 7 National traffic growth forecast

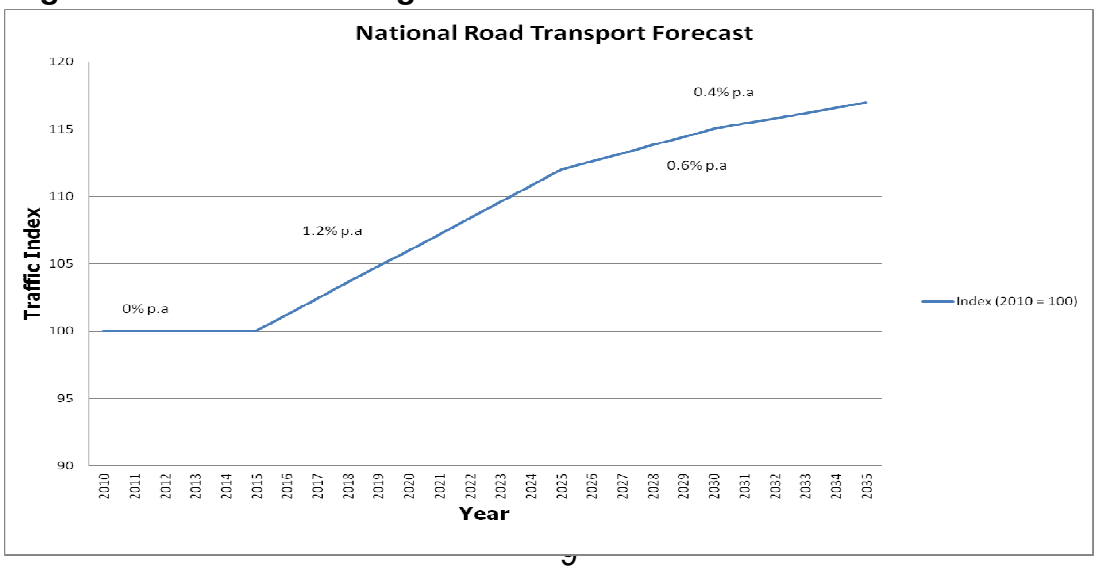
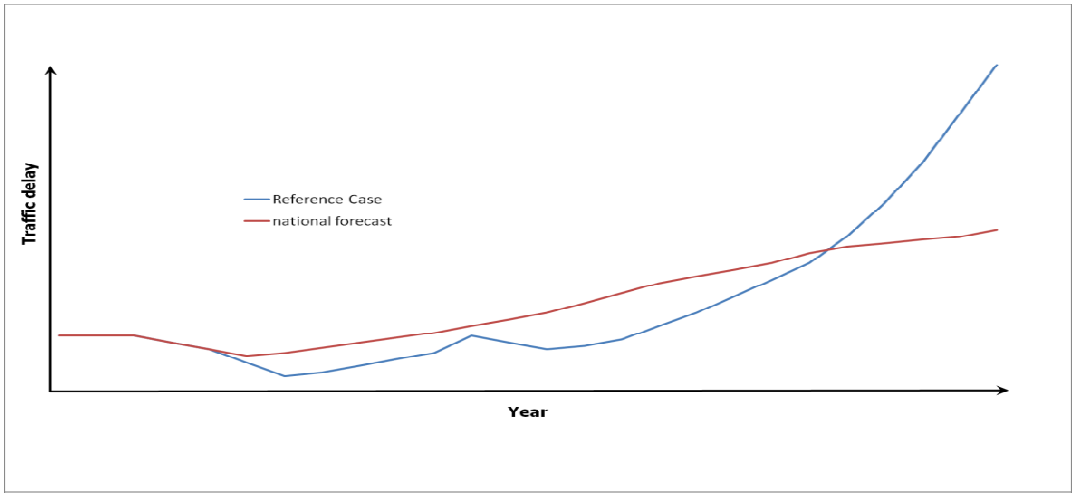


Figure 8 Indicative change in congestion delay over the plan period for the reference case Vs national traffic growth forecast



28. In considering the more 'human' aspects of the 'reference case', the cost of congestion, overall, could increase from £31 million per year, to £83 million per year (using a generalised cost associated with journey time delay in SATURN). At a 'personal' level, the cost of congestion (i.e. the cost of congestion per household in York), could increase from £ 369 per year (2011) to £880 per year (2031).

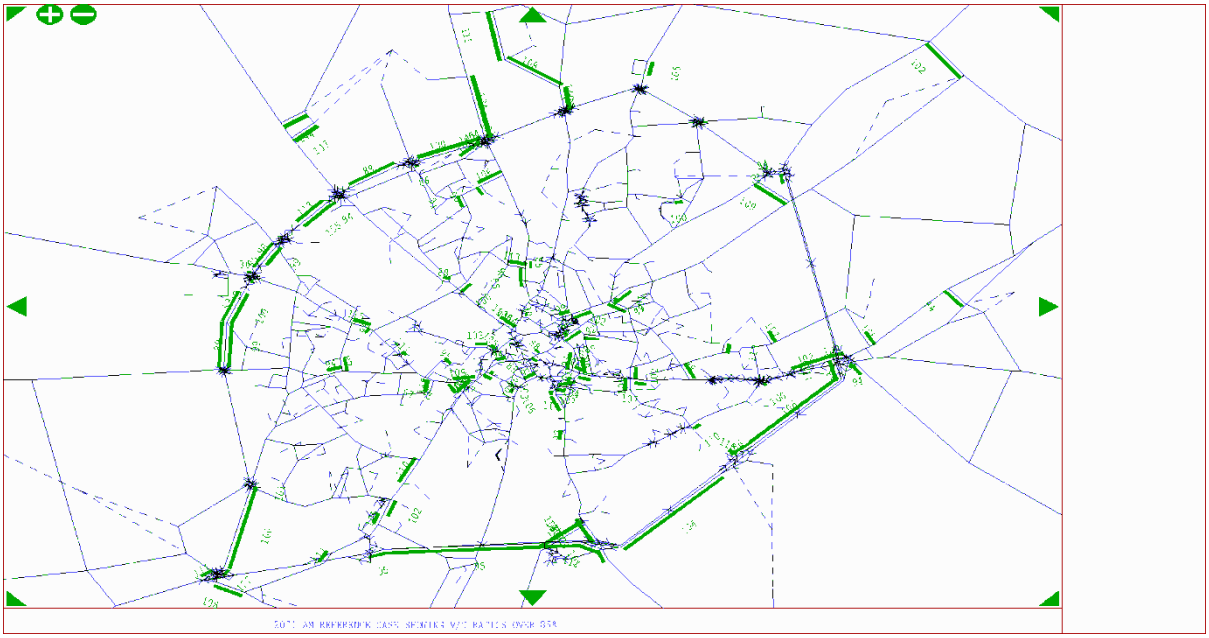
29. In terms of 'personal' travel, people travelling on radial routes into York could expect to see their journey time increase by 30% (e.g. a 30 minute journey would take about 9 minutes longer). On the orbital routes the percentage increase in journey time will be slightly less.

30. Car use is inelastic, compared to other forms of transport. In other words, drivers would tend to accept this extra travel time as part of their day, unless a much more attractive offer (alternative mode) is made available. With increased congestion at peak times, it is likely that more trips will be made outside of the peak hour (08:00 – 09:00), leading to more peak spreading (see also paragraph 34). Alternatively, these trips might be undertaken using other modes, or (less likely) not done at all.

31. The modelling predicts the generalised flow and delay across the network within the cordons listed in paragraph 12. The model also forecasts traffic flows on each individual link and junction of the network. Further examination of the modelling outputs revealed that several links and junctions will be close to reaching their theoretical capacity or exceed their theoretical capacity (i.e. a Volume/Capacity ratio equal to or greater than 0.85) at the end of the plan period, as shown in Figure 9.

32. It can be seen from Figure 9 that large sections of the Outer Ring Road are approaching or exceeding link capacity, even with the roundabout improvements on the A1237. This appears to show that the modelled infrastructure improvements in the reference case alone are insufficient to cater for the additional demand on the network arising from future growth. Furthermore, the outputs from the modelling indicate that the additional demand on the network could be such that both existing traffic and traffic arising from new development is forced on to less suitable routes as it seeks to avoid congested areas.

Figure 9: Links close to exceeding or exceeding theoretical capacity



Further Interventions and their likely impacts on delay

33. LTP3 sets a short-term target of limiting the increase in area-wide traffic volume for various time periods (Indicator LI10) to 3% or less by 2014/15 (compared to 2008/09 baseline). This equates to approximately 1% per year (2011/12 to 2014/15) and is lower than the average annual rate of traffic growth in the 'reference case'.

34. There is a range of interventions within LTP3 which aim to either reduce the amount of traffic generated by development, or mitigate its effects

Potential additional infrastructure and its likely impacts

35. There is a range of, mainly higher cost, transport infrastructure improvements and interventions that could achieve these aims and which City of York Council intends to pursue or support to deliver the plan. These are likely to have a lower level of confidence of being implemented within the plan period than the 'Reference case' measures and include (but are not limited to):

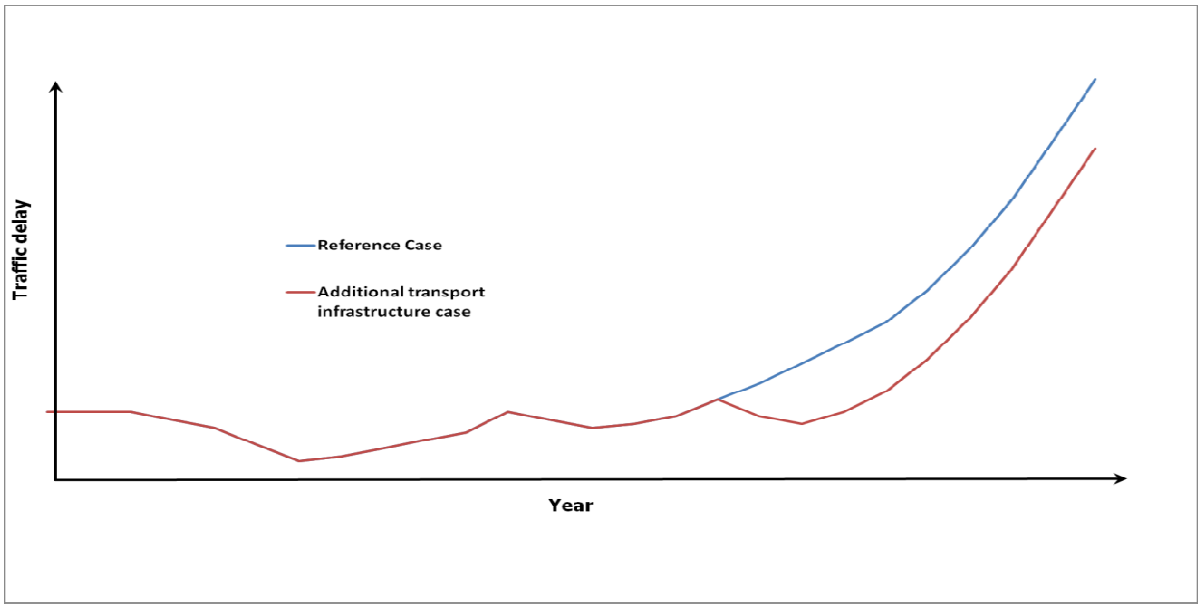
- **Further carriageway and junction capacity enhancements to the A1237 –** dualling of most congested sections and upgrading junctions to grade separated junctions (GSJs). These could achieve a reduction of up to 13% in the delay multiplier.
- **A new public transport turn-around and interchange facility at York Station -** as part of a general package of measures to improve access at the Station. This could achieve a reduction of up to 10% in the delay multiplier.
- **New railway stations** / **halts** for heavy or light rail services. These could achieve a reduction upwards of 1% in the delay multiplier for each station / halt constructed.
- **Further expansion of Park & Ride services.** This could achieve a reduction of up to 3% in the delay multiplier..

- **Introduction of Tram/train technology.** This could bring down the delay multiplier by approximately 7%.
- **Freight Transhipment centre.** Early indications from an outline business case are that a consolidation centre could considerably reduce mileage travelled by delivery vehicles within the city.

Implications

36. Providing additional infrastructure could result in a significant reduction in delays compared to the 'reference case'. However, further modelling work will need to be undertaken to quantify this. Until such time as this completed, Figure 10 shows the indicative delay 'picture' of additional investment in transport infrastructure over-and-above the reference case compared to the reference case.

Figure 10 'Additional transport infrastructure case' Vs 'Reference case' indicative change in congestion delay over the plan period



Other potential mitigation options and their likely impacts

37. The range of other mitigation measures that could, potentially, be introduced to reduce traffic delays include:

- **Smarter Choices** (Behavioural Change, Sustainable Travel promotion, bus subsidy etc.). This could bring the delay multiplier down by between 26% and 46%
- **More Off Peak Travel** (peak spreading). There is there is approximately 24% and 21% spare capacity in the 1 hour pre and post peak hour respectively, enabling the transfer of trips out of the peak hour to take place. Peak spreading might be encouraged though promotion of flexible working.
- **Traffic management efficiencies**. These could produce delay savings of up to 5%

Other considerations

Induced traffic

38. Any measures to reduce congestion have the potential to enable traffic to move faster, and therefore can induce more traffic, thus reducing the benefits. Any measures that reduce traffic, or traffic growth, will need other associated measures to 'lock-in' the benefits attained.

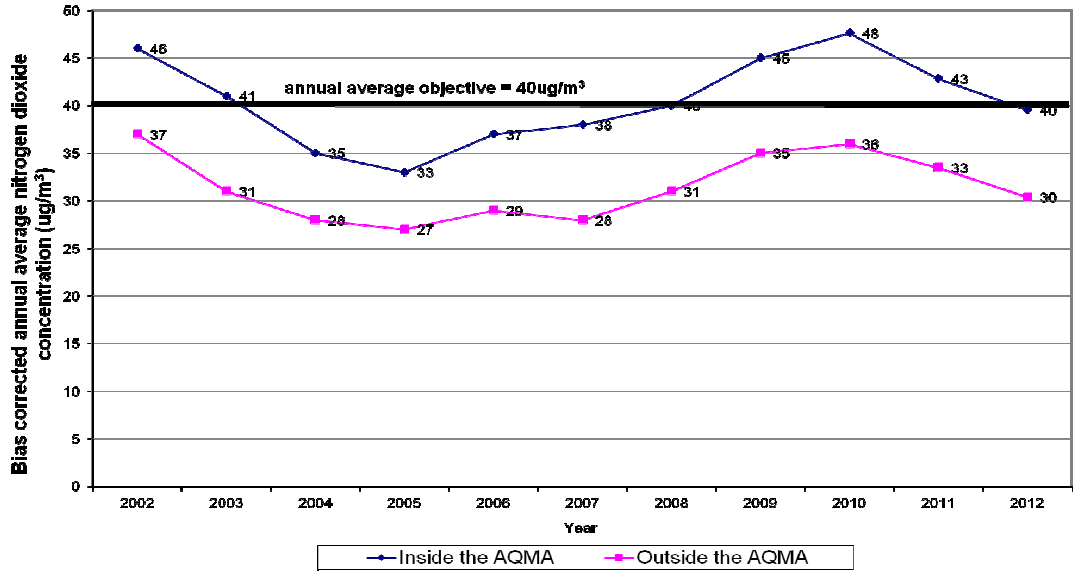
Other development opportunities

39. In addition to the planned growth rates in the Local Plan, other additional development may also take place either before or after the Local Plan is adopted. Any major development over-and-above that set-out in the Local Plan could have considerable impacts on the demand for travel, and hence traffic levels and delays, which may require mitigation measures and/or lead to a revision of the growth rates in the Local Plan.

Greenhouse gas emissions and emissions harmful to health

40. The Topic paper on the transport implications of the LDF described the requirements for the legally binding target, imposed under The Climate Change Act, for reducing UK greenhouse gas emissions and how developments in engine/fuel technology have reduced emissions of CO_2. However, these reductions in CO_2 emissions have, perversely, been at the expense of increasing the level of pollutants, such as oxides of Nitrogen, that are harmful to health. In York this has resulted in deteriorating air quality, between 2005 and 2010 which resulted in breaches of health-based exceedence levels for Nitrogen Dioxide (NO_2) between 2008 and 2011, as shown in Figure 11. Due to this deterioration in air quality three Air Quality Management Areas (AQMAs) have been declared in York and Figure 11 shows that within the City Centre AQMA NO_2 concentrations have remained below the exceedence level.

Figure 11 – Annual fluctuations in NO_2 concentrations across the city centre AQMA (2002-12)



41. More recent results (from 2010 onwards) show average concentrations of NO_2 falling within and outside the City Centre AQMA. However, these average values do not show the exceedences at any particular individual NO_2 monitoring site across York (of which there are forty). In addition, the colder wetter summer of 2012 and to a lesser extent 2011 may have contributed to this reduction, so this recent improvement may not be sustained, or could even reverse again. Notwithstanding this, continued traffic growth in the future (and peak spreading) will, unless a major reduction in individual vehicle emissions is achieved, result in a further deterioration in air quality and is likely to see more AQMAs being declared. It can also lead to a further deterioration in the general 'quality of life' in the city.

Proposed approach

42. The proposed approach can be summarised as:

- Permit development in locations that are, or can be made, highly accessible buy means other than private motorised transport
- Pursue the completion of one relocated and expanded Park & Ride at Askham Bar and the completion of two new Park & Ride sites at Poppleton Bar (A59) and Clifton Moor
- Implement other strategic public transport improvements, including rail
- Complete James Street Link Road Phase II
- Implement a package of improvements to the junctions on A1237 Outer Ring Road
- Pursue the further carriageway and junction capacity enhancements to the A1237 Outer Ring Road
- Continue a sustained travel behaviour change programme to minimise generated trips
- Implement the low – cost transport infrastructure and service improvements to support the travel behaviour change programme
- Pursue restricting the access of higher polluting vehicles within the Air Quality Management Area(s)

43. More detail regarding the proposed measures to realise this approach and how they are to be delivered is contained in Section 23 of the Local Plan and in the supporting Infrastructure Delivery Plan.

Effects of environmental enhancements

44. In the modelling undertaken it has been assumed that traffic can redistribute across the entire network to find its 'optimum path'. In some cases, it would be beneficial to protect some parts of the network, such as residential areas, from suffering increases in through traffic in order to prevent deterioration in safety or other aspects that affect local quality of life. It is likely that protection of this type will increase delays on other parts of the network, such as key corridors into the city.

45. A city centre that is viable and has vitality is crucial to the economic prosperity of York. One of the aspects being considered is how the city centre is to be accessed in the future and a 'City Centre Movement and Accessibility Framework' study[8]

[8] York City Centre Movement and Accessibility Framework, Strategy and Proposals, JMP, 2011

considered several options for changing access arrangements in the city centre and their effects. This work revealed that reassigning road space for the easier movement of public transport in the city centre increased traffic flows on other parts of the inner ring road and Water End, which already experience significant congestion. The council will be conducting a trial of a 'prioritised route' on a section of the inner ring road, commencing in August 2013, to ascertain the benefits and disbenefits of reassigning road space in the city centre.