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IPSWICH CORE STRATEGY

IPSWICH TRAFFIC APPRAISAL MODELLING SUITE (ITAMS) FORECAST MODEL REPORT

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WSP | PARSONS BRINCKERHOFF

IPSWICH CORE STRATEGY

LOCAL PLAN FORECAST MODELLING

Suffolk County Council

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1 GLOSSARY

- **Active Modes –** Within this modelling suite, active models relate to trips by walking or cycling.
- **Adjusted Planning Data –** TEMPro (see below) allows for the use of alternative assumptions which are different to the standard set of assumptions. This allows for specific allocated developments to be discounted from the assumptions or to adjust the overall assumptions to tie in with alternative data sources.
- **AM Peak –** the morning peak hour (08:00 – 09:00)
- **AM Period –** the morning peak period (07:00 – 10:00)
- **Assignment –** A Traffic Assignment Model, in this case SATURN, has been used. An assignment model requires two general inputs – a "trip matrix" and a "network" (thought of as the "demand" and "supply" inputs – provided by the user). These are input into a "route choice" model which allocates or assigns trips to "routes" through the network, as a result total flows along links in the network may be summed and the corresponding network "costs" (e.g. times) calculated.
- **Committed Development –** All land with current planning permission or allocated for development in adopted development plans (particularly residential development) (Planning Portal Glossary).
- **Connected and Autonomous Vehicles -** Connected and autonomous vehicles incorporate a range of different technologies, facilitating the safe, efficient movement of people and goods. This will help to improve mobility and productivity, and offer an alternative to driving.

  Increasing levels of connectivity will allow vehicles to communicate with their surrounding environment (including the infrastructure and other vehicles). This would provide valuable information for the driver about road, traffic, and weather conditions, and on routing options.

  Vehicles with increasing levels of automation will use information from on-board sensors and systems so they can understand their global position and local environment. This would allow them to operate with little or no human input (i.e. be driverless) for some, or all, of the journey. (source Gov.UK)
- **DCLG Table 406 –** Department for Communities and Local Government Table 406 Household projections by district, England, 1991- 2037 forecasts (2012-based, published 27 February 2015) have been used. Further information can be found at: https://www.gov.uk/government/statistical-data-sets/live-tables-on-household-projections
- **EEFM –** East of England Forecasting Model
- **ELNA -** Employment Land Needs Assessment for Ipswich and Waveney Economic Areas
- **Emme –** Emme is a complete travel demand modelling system for urban, regional and national transportation forecasting models. Further information can be found here: http://www.inrosoftware.com/en/products/emme/
- **IBC –** Ipswich Borough Council
- **IP Hour –** Inter Peak Hour (a single average hour between 10:00 – 16:00)
- **IP Period –** Inter Peak Period 10:00 – 16:00
- **IPA –** Ipswich Policy Area
- **ITAMS –** Ipswich Transport Appraisal Modelling Suite

- **GONZO –** A parameter in SATURN (see below) which factors all elements within a matrix (see below)
- **Local Plan -** A Local Plan is a set of documents that determine how development will be planned over time.
- **LPA –** Local Planning Authority
- **Matrix –** see Trip Matrix
- **Network –** specifies the physical structure of the roads, etc upon which trips take place and the parameters within it. In this report, parameters is being used as a generic descriptor of all of the pieces of information / options that go into the Saturn network, it is not a specific modelling term.
- **NTEM –** National Trip End Model, Latest version 6.2. The National Trip End Model produces estimates of person travel by all modes (including walk and cycle) for each zone in Great Britain, of which there are approximately 2,500. The model outputs trip productions (e.g. homes) and trip attractions (e.g. sites of employment) in each zone (collectively known as trip-ends), which may be separated by mode, journey purpose, household car ownership category and time period.
- **NTM** – National Transport Model provides a means of comparing the consequences of national transport policies or widely-applied local transport policies, against a range of background scenarios which take into account the major factors affecting future patterns of travel. The model produces future forecasts of road traffic growth, vehicle tailpipe emissions, congestion and journey time (Department for Transport website).
- **OP** – Off peak (19:00 – 07:00)
- **PCU** – Passenger Car Unit, is a method used in Transport Modelling to allow for the different vehicle types within a traffic flow group to be assessed in a consistent manner. Measured to be 5.75 m. Typical factors are 1 for a car or light goods vehicle, 2 for a bus of heavy goods vehicle, 0.4 for a motorcycle and 0.2 for a pedal cycle.
- **Permitted Development** - Permission to carry out certain limited forms of development without the need to make an application to a local planning authority, as granted under the terms of the Town and Country Planning (General Permitted Development) Order (Planning Portal Glossary).
- **Person Trip Rate –** The number of people making a given trip as opposed to the number of vehicles making a trip.
- **PM Peak –** Afternoon Peak (17:00 – 18:00)
- **PM Peak Period –** Afternoon Peak Period (16:00 – 19:00)
- **Pre-Load Assignment –** flow data loaded into an assignment from a separate initial assignment replicating the previous hour, e.g. for the AM Peak Hour the pre-load assignment would replicate the period 07:00 – 08:00
- **Production and Attraction –** Trip production models estimate the number of home-based trips to and from zones where trip makers reside. Trip attraction models estimate the number of home-based trips to and from each zone at the non-home end of the trip**.**
- **RIS –** Road Investment Strategy, the spending plan for Highways England over a 5 year period.
- **SATURN –** Simulation and Assignment of Traffic to Urban Road Networks is a suite of network analysis programs used to assess the impact of road-investment schemes. Current version 11.3.12F + UPDATE 1. See also assignment. Further information can be found here: https://saturnsoftware.co.uk/
- **SCC –** Suffolk County Council

- **TEMPro** - TEMPro is the Trip End Model Presentation Program. The National Trip End Model (NTEM) forecasts and the TEMPro software are used for transport planning purposes. The forecast includes: population, employment, households by car ownership, trip ends, and simple traffic growth factors based on data from the National Transport Model. The current version, and the version used for this work, is NTEM 6.2. Further information can be found at: https://www.gov.uk/government/collections/tempro
- **Trip Matrix** – the "Trip Matrix" T_{ij} specifies the number of trips from zone i to zone j
- **V/C Ratio** – Volume / Capacity Ratio. The assigned model flow is the volume of traffic in PCUs per hour, with the V/C percentage calculated as the volume relative to the capacity in percentage terms.
- **WebTAG** – Web Transport Appraisal Guidance. Documentation produced by the Department for Transport (DfT) to assist in transport appraisal and modelling to ensure consistency and robustness.
- **Windfall Sites** – sites for housing that have yet to be identified, accounted for through background growth.
- **Zone Loading Point –** the origins and destinations of trips within a network

A further glossary of planning terms can be found here:
https://www.planningportal.co.uk/directory/4/glossary

2 EXECUTIVE SUMMARY

REPORT PURPOSE

2.1.1 WSP | Parsons Brinckerhoff have been commissioned to undertake an assessment of the Ipswich Core Strategy and Policies Development Plan Document Review and Ipswich Site Allocations and Policies (Incorporating IP-One Area Action Plan) Development Plan Document (the Ipswich Local Plan) on the highway network for a forecast year of 2031.

2.1.2 The purpose of this report is to assess the impact upon the highway network of the development planned within the Local Plan and to identify junctions that are likely to experience congestion in the future. The assessment has therefore focused upon network performance statistics and individual junction capacity assessments.

2.1.3 Network performance statistics give an indication of the overall network stress between different models, and can provide an understanding of how the network is performing relative to the traffic demand. The 2031 forecast models have been compared to the 2008 base year for the transport model in order to assess the impact on network performance in 2031. The Local Plan covers the period 2011 – 2031.

2.1.4 For the purpose of the assessment of individual junctions within this report, the volume to capacity (V/C) percentage is used. V/C percentages above 100% show a junction / approach / turn which experiences a traffic flow beyond its capacity. These locations show the greatest network stress and suggest delays are likely. At these locations the network may cease to function efficiently and blocking back from queuing may occur, constraining the capacity and causing congestion on adjacent links and junctions. Locations at which the V/C percentage is between 90-99% are also considered likely to experience congestion and are highlighted within the analysis. Table 2-1Table 6-6 outlines the V/C percentage bands which are considered within this report and how junctions have been categorised into significant and potentially significant impacts.

Table 2-1 V/C percentage bands

DESCRIPTION	V/C PERCENTAGE BAND
Significant	**100% +**
Potentially Significant	**90 – 99%**

2.1.5 This report supersedes the original draft prepared in August 2015 and the analysis within this revision uses the recently updated Ipswich Transport Analysis Modelling Suite (ITAMS). As a result, this analysis includes an Emme public transport and demand model which assesses trip frequency, active mode choice, time period choice, mode choice, trip distribution and parking choice that was not used in the original August analysis.

WHAT HAS BEEN DONE?

2.1.6 The Ipswich Transport Analysis Modelling Suite (ITAMS) was recently updated by WSP | Parsons Brinckerhoff to support the Outline Business Case of the Ipswich Wet Dock Crossing (IWD) in 2015. Prior to this, ITAMS was updated by Faber Maunsell | AECOM in 2009, with a base year of 2008 and comprises a SATURN highway model and Emme public transport and demand model. The 2008 model prepared by Faber Maunsell | AECOM was agreed with the Department for Transport (DfT) at the time.

2.1.7 The forecast modelling contained within this report represents the cumulative impact of proposed developments coming forward up to 2031. Ipswich Borough Council has a target of delivering 13,550 houses and approximately 12,500 jobs between 2011 and 2031. Given the base year for the ITAMS is 2008, the increase in housing and commercial development was considered for a period between 2008 and 2031. An additional 800 dwellings have been included within the Ipswich Garden Suburb site to reflect the anticipated additional build out post 2031. This takes the total number of dwellings modelled to 14,350 and is beyond the submitted Local Plan housing need figure (13,550).

2.1.8 It is assumed that the IWD will open in 2021, given recent DfT confirmation in the March 2016 Budget, and it has therefore been included within all forecast model scenarios. A key assumption in the IWD Business Case was the decision to assume a single lane gyratory on the basis that the Ipswich Waterfront Transport Study (2007) by Colin Buchanan and Partners would have been implemented. As it has yet to be implemented, and as result of discussions with IBC it was considered appropriate to test the following two scenarios:

- A single lane Star Lane gyratory
- A two-lane Star Lane gyratory

2.1.9 A draft of this report was produced in August 2015. This previous report used 1 April 2014 as a baseline for development; however, this revised report updates developments to a baseline of 1 April 2015 based on information received from Ipswich Borough Council (IBC), Suffolk County Council (SCC) and Ipswich's neighbouring local authorities. All development, households and commercial, has been reviewed and uses the latest assumptions relating to employment density. Given the base year for the ITAMS is 2008, appropriate adjustments to background growth and development levels have been made. Further, the preliminary assessment in August 2015 was solely based upon the highway model.

2.1.10 As part of the Ipswich Wet Dock Crossing work, it was agreed with the DfT that an updated 2008 model would be developed, rather than a new 2015 model on the basis the 2008 model would enable the use of the existing Emme demand model. It was considered that this gave a better assessment of forecast years than developing a new 2015 base year model without an associated demand model component and a new demand model could not be built in the time available for the study. A new Suffolk County Council countywide model is currently in development which will supersede this model and be completed in September 2016.

2.1.11 Unlike the August 2015 draft, this assessment uses this updated model and associated Emme model. This allows for trip frequency, active mode choice, time period choice, mode choice, trip distribution and parking choice. Therefore some junctions will be relieved of stress through the impact of these additional model elements. Both the demand model and highway assignment model networks have been updated to reflect the latest information available. This explains why the list of junctions highlighted as suffering stress is not identical to the previous list; the demand is less due to different development assumptions and trip suppression. The routes and junctions affected will therefore be different.

2.1.12 A core element of the demand forecasting assumptions is the use of TEMPro which assumes therefore will be background growth in jobs and housing. This assessment however adjusts these background assumptions on the basis of the development details received from SCC and IBC to ensure consistency with the Local Plan proposals and other committed development.

2.1.13 The demand model is able to take account of the congestion that might be generated by the additional development and reassign trips to other modes, such as walking, cycling, and public transport. The separate Air Quality assessment being conducted by WSP | Parsons Brinckerhoff will therefore be reflective of this modal shift and provide a realistic assessment of the conditions that may prevail in 2031.

WHAT THE RESULTS SHOW

2.1.14 This growth in traffic is a result of changing patterns of travel behaviour and predicted future growth in housing and jobs in and around Ipswich. The transport modelling factors in an element of growth when predicting future traffic impacts and has been adapted for the purposes of this assessment to consider the specific growth locations identified in the Ipswich Local Plan. The results cannot therefore be interpreted as simply as 'Local Plan vs no Local Plan', i.e. it could not reasonably be assumed that if there were no Local Plan traffic patterns would be the same in 2031 as they were in 2008, 2011 or 2015.

2.1.15 The growth assumptions include all of the specifically considered development within the local plan, but also growth generated through population growth, car ownership and relative vehicle operating costs through the use of the Department for Transport TEMPro software.

2.1.16 The analysis has compared 2031 to the 2008 scenario. As a result some of the junctions which show increases in congestion are already more problematic today than in 2008 and this should be considered when assessing the relative performance between the present day and 2031.

2.1.17 This analysis has demonstrated that there will be a substantial increase in over capacity queues, total travel time, and total travel distance in 2031. The increase in travel time and distance can largely be attributed to the increase in number of trips. This can be seen by the relatively small reduction in average speed and small additional travel time per vehicle. This is a situation experienced by most other towns and cities across the country given the need to deliver jobs and houses.

2.1.18 Numerous locations across the network are shown to have capacity issues, measured using the volume to capacity (V/C) percentage which compares the capacity of the network to the assigned traffic flow. V/C percentage figures above 100% are considered to represent significant levels of congestion, whilst V/C values between 90-99% are considered potentially significant. The analysis in this report splits the junction into the following categories to better prioritise the junctions showing the greatest stress:

- → Greater than 100% in both the AM and PM peak
- → Greater than 100% in either the AM peak or the PM peak
- → 90-99% in both the AM peak and PM peak
- → 90-99% in either the AM peak or the PM peak

2.1.19 The location of those junctions which experience stress in both the AM and PM peaks and have a V/C ratio above 100% are shown in Figure 2-1 for the single lane gyratory and Figure 2-2 for the two lane gyratory. Maps illustrating the locations of these junctions can be found in Figures 3 and 4 of Appendix G.

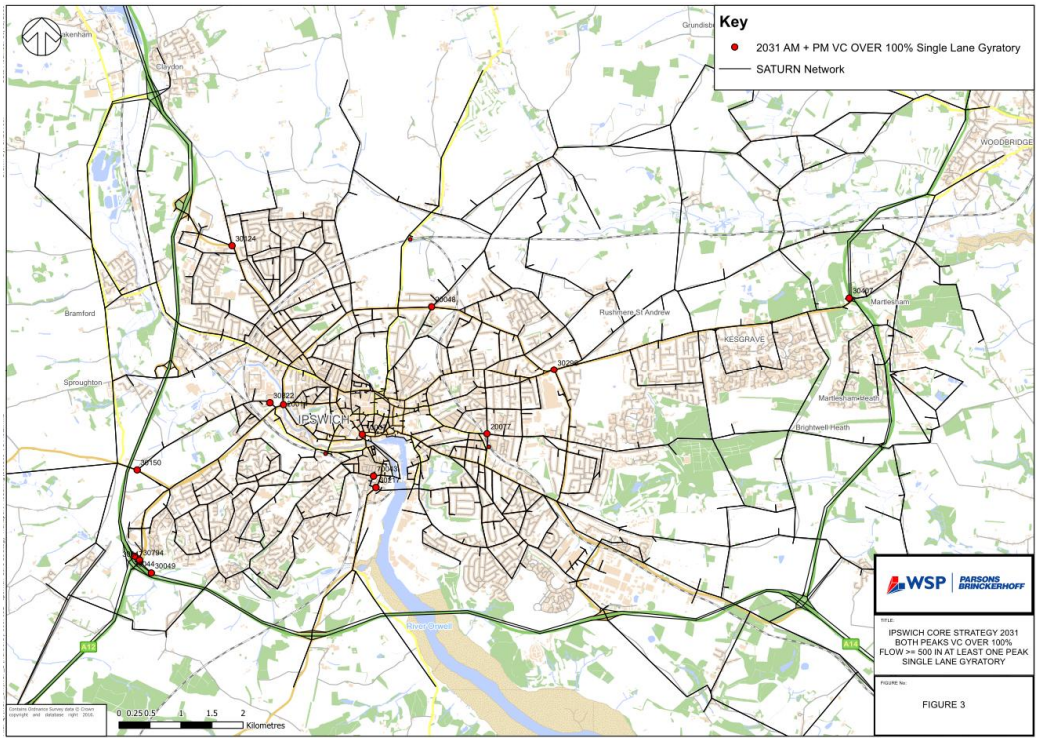

Figure 2-1 Single Lane Gyratory – Junctions with a VC of 100% + in both peaks

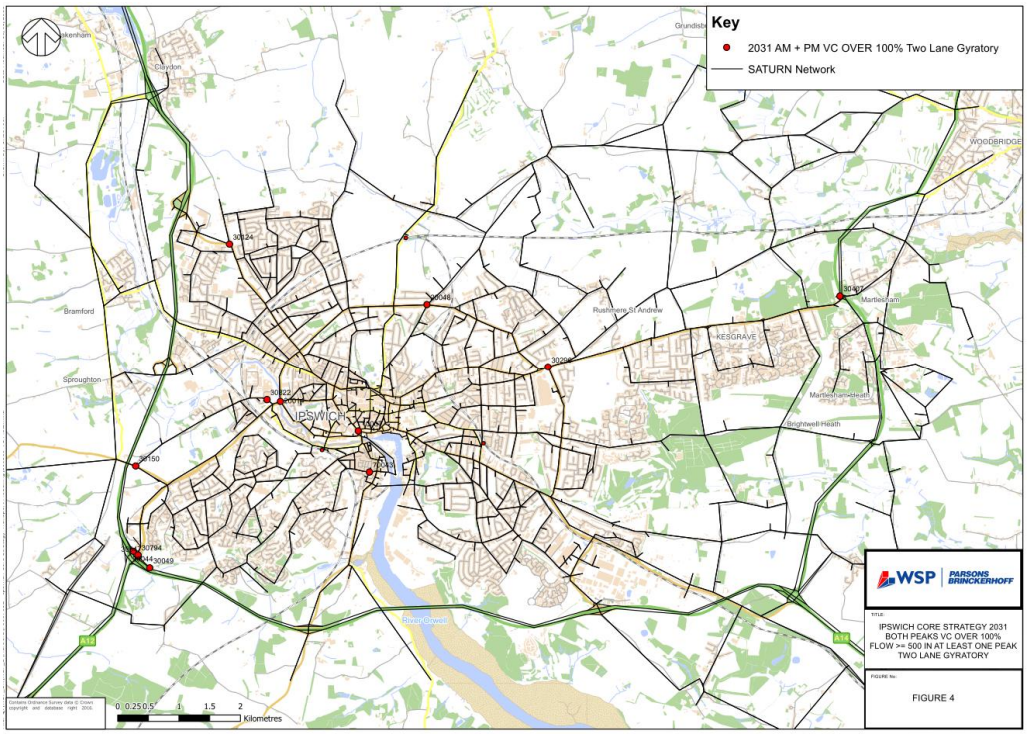

Figure 2-2 Two Lane Gyratory – Junctions with a VC of 100% + in both peaks

2.1.20 There are 15 junctions that have been identified with V/C ratios greater than 100% in both peak periods. In particular A14 Junction 55 (Copdock Interchange) is shown to experience substantial congestion and delay with multiple parts of the junction reaching a V/C above 100%, irrespective of the scenario. This should be expected given the extensive existing congestion at the junction. Congestion at this junction is being analysed as part of a separate A14 junction study being undertaken by Suffolk County Council, which aims to assess potential junction improvement schemes required on the A14 within Suffolk.

2.1.21 Capacity issues at Tuddenham Road appear to be related in part to the proposed development at Ipswich Garden Suburb and increased traffic volumes into Ipswich town centre. The junction would experience increases in congestion in the morning peak.

2.1.22 Congestion issues at the other 15 junctions highlighted are more difficult to attribute to specific new developments, but an impact is identified as a result of the combined impact of background traffic growth and planned and committed development which are set out in further detail in section 6.

WHAT DOES THIS MEAN?

2.1.23 The analysis has shown that while many junctions may be close to or exceed capacity in 2031; there are also many parts of the network that will operate satisfactorily. Overall the impact upon average travel time per trip is less than or equal to 2 additional minutes for all time periods and scenarios when compared against 2008 network performance. This impact cannot be considered as severe given the day to day fluctuation in travel times would likely be greater than this for most trips.

2.1.24 Further, the development proposals assessed within the model would, as part of their planning applications, need to consider additional measures to help mitigate any impact. The analysis within this report has not identified any locations where it is unlikely such mitigation could not be delivered.

2.1.25 It is also necessary to remember that improvements in capacity through the removal of bottlenecks, whilst desirable in one location, can have knock on impacts which would be less desirable than the existing congestion. For example, as traffic is more freely able to move into the network, in this case Ipswich Town Centre the problem will simply move to another location. Equally, hard engineering and infrastructure solutions are not the only solutions available. Other solutions involve the optimisation of existing infrastructure and an emphasis on sustainable transport, through for example personal travel planning. Over the lifetime of the plan it is reasonable to assume that policies on sustainable transport will help to mitigate some of the increase in stress, and technological changes, such as those associated with Connected and Autonomous Vehicles, have the potential to independently improve traffic flow and conditions.

WHAT IS BEING DONE TO ADDRESS THIS?

2.1.26 A mitigation scenario has not been considered at this point of assessment. This is because the analysis has demonstrated that many of the junctions impacted on by the proposals are junctions and locations that are currently being assessed by Suffolk County Council under separate studies.

2.1.27 In undertaking these studies, further analysis will be carried out at specific junctions using detailed junction modelling to understand the nature of the capacity problems at the specific junctions highlighted in this report and to identify mitigation proposals.

2.1.28 These current assessments include:

- Ipswich Wet Dock Crossing – a new bridge across the River Orwell linking Wherstead Road with Landseer Road to enable regeneration of the town centre and reduce congestion on the A14 Orwell Bridge
- Star Lane Gyratory – further assessment of proposals in the Colin Buchanan and Partners report into the potential of Star Lane Gyratory to become a single lane gyratory
- A14 (countywide), including key Ipswich junction modelling - assessment of key problem junctions along the A14
- Northern Ipswich Capacity enhancements – a study to consider means of enabling development north of Ipswich to cater for the expected growth of the town over the next 20 to 30 years.

WHAT NEEDS TO HAPPEN NEXT?

2.1.29 A new County Wide Demand and Highway Model is currently being prepared (expected completion September 2016). This county wide model is a full demand model, constructed based upon mobile phone data trip matrices and will have a base year of 2016. This will include full detail of all the major settlements within Suffolk with connections to the rest of the country.

2.1.30 The new model will allow additional transport improvements associated with studies identified above to be included. Further, due to the countywide study area it will enable joint planning with neighbouring authorities.

2.1.31 The impact of specific local plan development sites could be assessed within the new model to identify those areas of mitigation that will be required by developers to mitigate their site impacts.

3 INTRODUCTION

3.1 BACKGROUND

3.1.1 WSP | Parson Brinckerhoff have been commissioned to undertake an assessment of the Ipswich Core Strategy and Policies Development Plan Document Review and Ipswich Site Allocations and Policies (Incorporating IP-One Area Action Plan) Development Plan Document (the Ipswich Local Plan) on the highway network for a forecast year of 2031.

3.2 TRANSPORT MODEL

3.2.1 The Ipswich Transport Analysis Modelling Suite (ITAMS) was recently updated by WSP | Parsons Brinckerhoff to support the Outline Business Case for the Ipswich Wet Dock Crossing (IWD) project in 2015. Prior to this the ITAMS was updated by Faber Maunsell | AECOM in 2009, with a base year of 2008 and comprises a SATURN highway model, which assesses vehicular trips on the highway network and a Emme public transport and demand model which assesses trip frequency, active mode choice, time period choice, mode choice, trip distribution and parking choice.

3.2.2 The 2008 model ITAMS prepared by Faber Maunsell | AECOM was agreed with the Department for Transport (DfT) at the time. As part of the IWD work, it was agreed with the DfT that an updated 2008 model would be developed, rather than a new 2015 model on the basis the 2008 model would enable the use of the existing Emme demand model.

3.2.3 It was considered that this gave a better assessment of forecast years than developing a new 2015 base year model without an associated Emme demand model component and a new demand model could not be built in the time available for the study. Further, a new Suffolk County Council County Wide Demand and Highway Model is currently in development which will supersede this model and will be completed in September of 2016.

3.3 MODEL SCENARIOS

3.3.1 Updates to the 2008 base year model have been undertaken as part of the IWD project and this updated model provides the basis for the testing of the core strategy.

3.3.2 It is assumed that the IWD will open in 2021, given recent DfT confirmation in the March 2016 Budget, and the IWD has therefore been included within all forecast model scenarios.

3.3.3 A key assumption in the IWD Business Case was the decision to assume a single lane gyratory on the basis that the Ipswich Waterfront Transport Study (2007) by Colin Buchanan and Partners would have been implemented. As it has yet to be implemented, and as result of discussions with IBC it was considered appropriate to test the following two scenarios:

- A single lane Star Lane gyratory
- A two-lane Star Lane gyratory

3.3.4 The forecast modelling contained within this report represents the cumulative impact of proposed developments coming forward up to 2031. Given the base year for the ITAMS is 2008, the increase in housing and commercial development was considered for a period between 2008 and 2031, acknowledging that the Local Plan covers the period 2011 - 2031.

3.3.5 The following details were provided by Suffolk County Council (SCC) and Ipswich Borough Council (IBC):

- Details of proposed residential and commercial developments (proposed for allocation through the Local Plan)
- Details of committed residential and commercial developments (those with extant planning permission)
- Details of residential and commercial completions from 2008 up to 31st March 2015.

3.3.6 This information was also provided in relation to the neighbouring local planning authorities (Babergh, Mid Suffolk and Suffolk Coastal districts). Given the base year for the ITAMS is 2008, appropriate adjustments to background growth and development levels have been made to account for the Local Plan period running from 2011 to 2031 and are set out within section 4.

4 INFORMATION / DATA PROVIDED TO WSP | PARSONS BRINKERHOFF

4.1 INTRODUCTION

4.1.1 This section sets out all of the information that has been provided to WSP | Parsons Brinckerhoff to undertake the assessment of the Local Plan proposals and the methodology for use of the data in the transport modelling. This includes information on residential and commercial developments received from IBC and the other districts, as well as national data sources on planning assumptions. It is therefore consistent with the assumptions used by IBC in the Local Plan.

4.2 STUDY AREA

4.2.1 The full model area and external area, alongside the SATURN network and Local Authority boundaries are depicted in Figure 4.1 below. Given the tightly drawn boundary of Ipswich Borough it is necessary to factor in development outside of the Borough, within the Ipswich Policy Area (IPA), as in transport terms these areas impact upon and function as part of Ipswich. Whilst the boundary of the Rest of the Fully Modelled Area (RFMA) shown below is not identical to that of the IPA it is broadly similar.

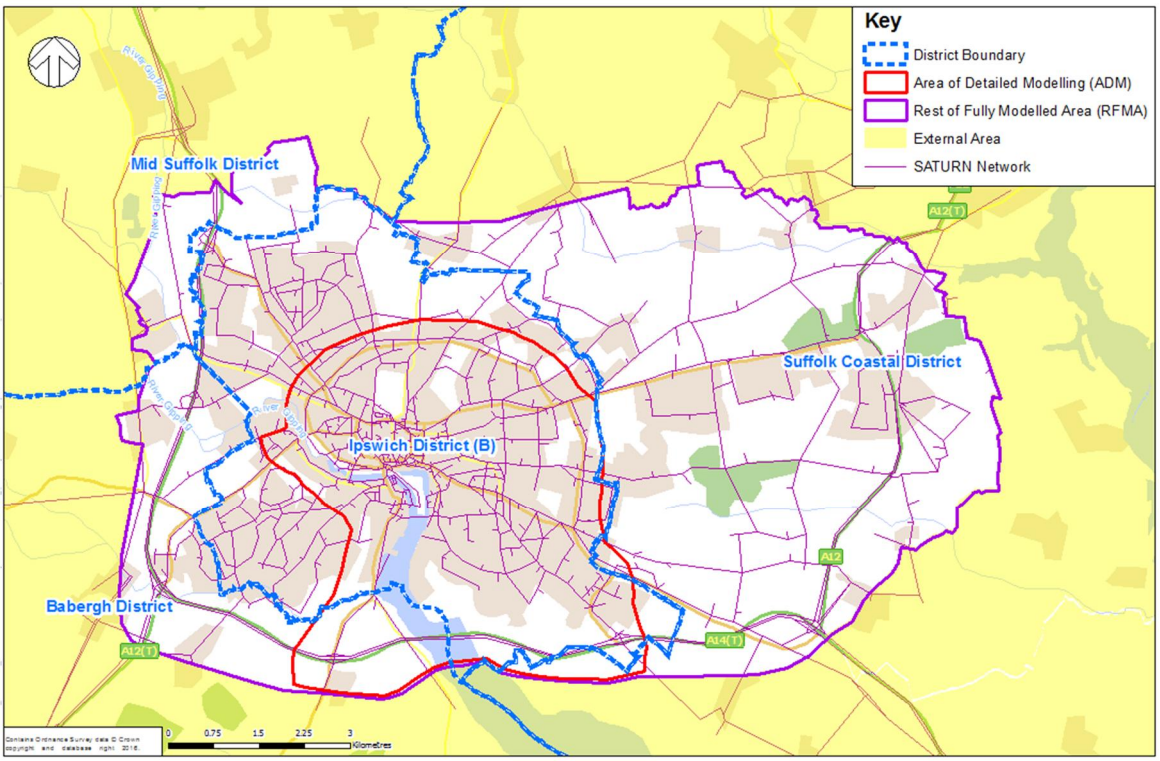

Figure 4-1 – Modelled Area

4.2.2 Although the external area is not modelled in detail, developments within the external area can still be explicitly modelled in external zones which provide connections into the detailed model area. This enables trips to access the fully modelled area network in appropriate locations and therefore the impact of sites within the external area on the detailed model area can still be assessed.

4.3 MODEL FILES RECEIVED

4.3.1 The structure of the ITAMS is such that there is both an Emme demand model and SATURN highway assignment model. The Emme demand model considers all modes of transport (walking, cycling, cars, heavy goods vehicles, light goods vehicles, and public transport); whilst the SATURN model is a highway only model considers heavy goods vehicles, light goods vehicles and cars. The SATURN model also includes bus movements as these impact upon the operation of the highway network.

4.3.2 WSP | Parsons Brinckerhoff were provided with Emme demand model files and the SATURN assigned network files (.UFS) and matrices (.UFM) by SCC on 6th February 2015 for a base year of 2008 and forecast year of 2021 for the AM peak, inter-peak, PM peak, and off-peak.

4.3.3 Following checks of the 2008 and 2021 SATURN models it was found the networks were identical when comparing the peak hours for the respective model years, with no changes to network structure or the parameters and costs. Therefore the 2008 base year network and trip matrices were used as the starting point from which to build a new 2031 forecast model. The following files were used:

- AM peak 2008 base year model (08base_AM_FINAL_ITAMS.UFS)
- AM peak 2008 base year matrix (ITAMS_2008_5UC_AM.UFM)
- PM peak 2008 base year model (08base_PM_Final_ITAMS.UFS)
- PM peak 2008 base year matrix (ITAMS_2008_5UC_PM.UFM)

4.3.4 The ITM contains five user classes (UC), as follows:

- UC1: Heavy Goods Vehicles (HGV)
- UC2: Light Goods Vehicles (LGV)
- UC3: Car commuting (trips to / from work)
- UC4: Car other
- UC5: Car employers business (work related journeys)

4.3.5 These files were updated as part of the IWD project and the updated files from this used. These updates included both enhancements to the network to provide additional detail in and around the Wet Dock area, including the crossing itself, as well as the disaggregation of zones within the matrix to improve zone loading points. Further details on the performance of the updated base model can be found in the Ipswich Wet Dock Crossing Local Model Validation Report.

4.3.6 For the purposes of testing the Local Plan the AM peak (0800-0900) and PM peak (1700-1800) models have been developed and tested for a forecast year of 2031. Traffic volumes are greatest during these time periods and therefore congestion and network stress will be most apparent in these peaks.

4.3.7 The model was set up with pre-load assignments to represent traffic levels in the preceding hour to the AM and PM peak with the use of GONZO. GONZO is a SATURN parameter that factors all elements in the trip matrix. GONZO was set to 0.81 in the AM pre-load assignment, and 0.96 in the PM pre-load assignment.

4.3.8 Bus routes were incorporated into the assignment via the use of '.PRN' files which assigns trips to the network on a link by link basis to replicate the number of bus trips made along a link in the given hour. The number of bus trips assigned is based on the 2008 files received since this is consistent with the IWD assessment, and the realisation that bus routes and frequencies can change over time. These were used in the peak hour assignments detailed within this report.

4.4 IPSWICH LOCAL PLAN

4.4.1 The Ipswich Local Plan submitted for Examination identifies a need for 13,550 dwellings over the period 2011 – 2031. Policy CS7:

- Identifies that 3,343 dwellings already completed, under construction, permitted, or with a resolution to grant permission were anticipated to come forward;
- Allocates land for 4,629 dwellings (including 2,700 at the Ipswich Garden Suburb up to 2031);
- Anticipates 1,800 dwellings coming forward as 'windfall' (i.e. on sites in Ipswich Borough but where locations are not currently known); and
- Identifies a residual of 3,778 dwellings for which the Council will need to work with neighbouring authorities due to the tightly drawn Borough boundary.

4.4.2 Policy CS13 of the submitted Local Plan contains a policy to encourage the provision of approximately 12,500 jobs between 2011 and 2031.

4.5 PROPOSED DEVELOPMENTS

4.5.1 The assessment of the proposed development has been split into two distinct sections:

- Specifically assessed development, for sites where development location and size (numbers of houses or jobs) are known or can be calculated
- Background traffic growth, for development which is planned, but the details or locations are not yet known (e.g. windfall sites).

4.5.2 Each is considered in detail in the following sections.

4.5.3 SPECIFICALLY ASSESSED DEVELOPMENT

4.5.4 SCC and IBC provided information on specific housing developments predominantly within Ipswich, but also for developments within the model study area (and Ipswich Policy Area) for Mid Suffolk, Babergh and Suffolk Coastal local planning authorities (LPAs). These included developments which had already been completed between 2008 and 2015, developments under construction, sites with planning permission or a planning application pending, and sites which were proposed allocations or allocations but for which no planning application had been submitted. For planning applications the number of permitted dwellings was used and for allocations or proposed allocations the number of dwellings specified with the allocation was used. Only sites of 20 dwellings or more have been specifically assessed, the impact of smaller sites will be assessed through 'background growth' (see Section 4.6).

4.5.5 Specifically assessed job totals were taken from a variety of sources. For developments which had a related planning application and reference number, the planning application form submitted for the development was downloaded from the relevant LPA planning portal online and the number of employees obtained, where available.

4.5.6 For sites proposed for allocation in the Local Plan, IBC provided a forecast level of jobs using employment densities contained in the Employment Land Needs Assessment for Ipswich and Waveney Economic Areas (ELNA). For allocations outside Ipswich Borough and for planning applications where no job number was specified the job total was estimated based on the anticipated land use and the job density ratio relevant to it. These ratios were taken from the 2016 Employment Land Needs Assessment or the 2010 Homes and Communities Agency (HCA) employment densities. These are detailed in Table 4-1.

Table 4-1 Job Density by Land Use Type

Land Use	Density (sqm per 1 job)	Source
B1a - General Office	12.5 sqm	2016 ELNA
B1a - Serviced Business Centre	10.5 sqm	2016 ELNA
B1a - Call Centre	8 sqm	2016 ELNA
B1a - Small Business Unit	32 sqm	2016 ELNA
B1b - High Tech	25 sqm	2016 ELNA
B1c - Light Industry	43 sqm	2016 ELNA
B2 - General Industry	43 sqm	2016 ELNA
B8 - General Warehousing and Distribution (Small Scale)	65 sqm	2016 ELNA
B8 - General Warehousing and Distribution (Large Scale)	74 sqm	2016 ELNA
C1 - General Hotel (3 star)	0.5 employees per room	2016 ELNA
C1 - 4/5 star hotel	0.8 employees per room	2016 ELNA
A1 - High street	19 sqm	HCA 2010 Retail
A1 - Food superstore	17 sqm	HCA 2010 Retail
A1 - Retail warehouse	90 sqm	HCA 2010 Retail
A2 - Financial professional	16 sqm	HCA 2010 Retail
A3 - Restaurants and Cafes	18 sqm	HCA 2010 Retail
D1 - cultural attractions	36 sqm	HCA 2010 Leisure
D2 – cinemas	90 sqm	HCA 2010 Leisure
D2 - Amusement centre	70 sqm	HCA 2010 Leisure
D2 - Sports centre and private club	65 sqm	HCA 2010 Leisure

4.5.7 The specifically assessed development totals based upon these sources / calculations are shown in Table 4-2. These developments are not only new jobs or dwellings, but also account for jobs lost through the loss of employment sites, such as through permitted development rights where commercial land uses have been converted into residential developments, where this information was made available to WSP | Parsons Brinckerhoff. Details of all housing and employment sites are provided in Appendix A.

Table 4-2 Specifically Assessed Jobs and Households

Area	Type	Total 2008 – 2031	2008 – 2011	2011 - 2031
IPSWICH	Jobs	10890	1210	9680
	Households	9003	1382	7621
MID SUFFOLK	Jobs	173	0	173
	Households	732	0	732
SUFFOLK COASTAL	Jobs	8779	0	8779
	Households	2919	201	2718
BABERGH	Jobs	5985	0	5985
	Households	725	0	725

4.5.8 In addition to the numbers set out within Table 4.2 and the remainder of section 4 of this report, an additional 800 dwellings have been included within the Ipswich Garden Suburb site to reflect the anticipated additional build out post 2031. This is takes the total number of dwellings to 14,350 and is beyond the submitted Local Plan housing need figure (13,550), despite the dwellings not expected to be completed within the plan period. However, it has been included at the request of IBC so the impact of the completed Ipswich Garden Suburb can be assessed.

4.6 BACKGROUND TRAFFIC GROWTH

4.6.1 The 2011 – 2031 Local Plan contains policies which seek to deliver 13,550 dwellings and approximately 12,500 jobs over this period. The developments specifically allowed for in Table 4.2 account for a considerable number of these dwellings and jobs but not all of them (and it should be noted that in terms of employment allocations the plan provides for more sites for B Class uses than the net requirement identified in the Employment Land Needs Assessment to provide for choice). It is therefore necessary to apply background growth to account for the difference to ensure the total impacts of the plan proposals are assessed. The model has a base year of 2008 so adjustments were necessary to account for the housing and job development between 2008 and 2011.

4.6.2 To establish the number of jobs and houses observed and forecast for 2008, 2011, and 2031 a number of sources have been used to derive the figures as listed below:

- TEMPro
- Department for Communities and Local Government (DCLG) 2012-based projections, published 27th February 2015 (DCLG Table 406)
- Local Authority jobs forecasts from the East of England Forecasting Model, 2014 run, published 8th January 2015

4.6.3 For jobs forecasts, all areas and years are based upon the local authority jobs forecasts from the East of England Forecasting Model (EEFM) as this is the basis of the Employment Land Needs Assessment which covers Ipswich and the surrounding districts. For Ipswich, the 2031 numbers in the model have been adjusted to ensure this equates to an additional 12,500 jobs from 2011 to reflect the Local Plan as the 12,500 jobs is based on a combination of the 2012, 2013 and 2014 EEFM runs.

4.6.4 For household forecasts, the highest of either the TEMPro and the DCLG estimates has been chosen. As the DCLG household forecasts are considered to be a ‘starting point’ for identifying housing need, it is not logical to select the TEMPro forecast where the difference between 2011 and 2031 would be lower than the DCLG forecast. This approach also ensures the impacts of the Local Plan proposals were not underestimated. For Ipswich, the 2031 household numbers have been adjusted in the model to ensure there is an additional 13,550 households from 2011 to reflect the submitted Local Plan. Due to the differing time periods covered by the adopted Local Plans of each of the neighbouring districts it was not possible to use housing and employment figures from the adopted Local Plans.

4.6.5 Table 4-3 provides the resultant figures used for each year, with the source of each figure indicated by the colour.

Table 4-3 2008, 2011, 2031 Total Jobs and Households

Area	Type	2008	2011	2031
IPSWICH	Jobs	77954	73429	85929
	Households	54770	57440	70990
MID SUFFOLK	Jobs	42472	43623	49343
	Households	39261	40489	48698
SUFFOLK COASTAL	Jobs	57098	57666	67089
	Households	53669	55730	65802
BABERGH	Jobs	38624	37109	42429
	Households	36894	37835	44152

TEMPRO	DCLG	LA	Calculated

4.6.6 The specifically allocated jobs and households do not account for all 12,500 jobs and 13,550 households and therefore background growth is required. The total jobs and households in 2008 and 2031 are shown in Table 4.3 above, with the growth calculated by subtracting the 2031 totals from the 2008 totals as set out in the Growth column in Table 4.4 below.

4.6.7 The specifically assessed development in Table 4.2 has then been subtracted from the 2008-2031 growth to establish the background traffic growth required as set out in Table 4.4.

Table 4-4 2008 – 2031 Background Traffic Growth

Area	Type	Growth	Specifically Assessed Development	Background Growth
IPSWICH	Jobs	7975	10890	-2915
	Households	16220	9003	7217
MID SUFFOLK	Jobs	6871	173	6698
	Households	9437	732	8705
SUFFOLK COASTAL	Jobs	9991	8779	1212
	Households	12133	2919	9214
BABERGH	Jobs	3805	5985	-2180
	Households	7258	725	6533

4.6.8 The negative growth factor in Ipswich is a result of job losses in the town between 2008 and 2011 as evident in the East of England Forecasting Model. The negative factor in Babergh is as a result of the specifically allowed for development exceeding the forecast growth in Babergh.

4.6.9 In discussion with IBC, it was considered appropriate to retain the Babergh development sites in the assessment given their proximity to Ipswich, albeit that for the purposes of this exercise a general reduction from the wider area through background traffic growth would be necessary to tie in with the forecasts. It was considered this approach would provide the most appropriate indication of potential traffic impact for the purposes of this assessment, given that development near Ipswich could have a more significant impact upon Ipswich that just modelling background traffic growth alone.

4.6.10 The total dwellings and jobs added into the model for each year are shown in Table 4-5 and Table 4-6 and confirm the 2011-2031 figures for Ipswich are consistent with the submitted Ipswich Local Plan.

Table 4-5 Dwellings 2008 to 2031

District	Dwellings (2008 – 2011)	Dwellings (2011 – 2031)	Total Dwellings (2008 – 2031)
Ipswich	2670	13550	16220
Mid Suffolk	1228	8209	9437
Babergh	941	6317	7258
Suffolk Coastal	2061	10072	12133
Total	**6900**	**38148**	**45048**

Table 4-6 Job Growth 2008 to 2031

District	Jobs (2008 – 2011)	Jobs (2011 – 2031)	Total Jobs (2008 – 2031)
Ipswich	-4525	12500	7975
Mid Suffolk	1151	5720	6871
Babergh	-1515	5320	3805
Suffolk Coastal	568	9423	9991
Total	**-4321**	**32963**	**28642**

4.7 TRANSPORT SCHEMES

4.7.1 In order to update the SATURN model network, SCC provided details of highway improvement schemes which had been completed between 2008 and April 2015. Many schemes were minor improvements which do not have an impact within a strategic modelling context. Checks were made of the coding of each location listed by SCC as undergoing improvement and listed modifications checked against satellite imagery and Google Street View. Details of the changes made are listed in Table 4-7.

Table 4-7 Network Amendments

	Scheme Type	AECOM junction ref/ route	Scheme Description	Model Changes Made
1	T	OCM	Old Cattle Market	Bus Station Improvements – no need for mode changes
2	N-T	Blue	Majors Corner	Change to nodes 10023 and 10025 to add new connection to replace ATS junction redesign, share use footway and public realm improvements
3	N-T	Orange	Portman Road/Handford Road	Node 20016 - Addition of 2 PCU flare from node 20314
4	T	Purple	Civic Drive / Franciscan Way	Updated from Roundabout to Signalised node 10004
5	Signal	B03-J4	Felixstowe Road / King's Way	New junction construction – no need for model changes
6	Signal	C05-J3	Stoke Bridge / Bell Corner / Vernon Street	No model change required
7	Signal	D08-J4	London Rd / Yarmouth Rd / West End Rd	Node 20014 – addition of 3 PCU flare from node 20015, with reduction in lane numbers from 3 to 2. Adjustments to intergreen timings
8	Signal	D09-J3	London Rd / Handford Rd	No model change required
9	Signal	E01-J3	Bramford Road / Sproughton Road	Node 30142 - Reduction in number of lanes from node 30143 from 2 to 1 – single lane approach at Bramford Road western approach
10	Signal	F11-J4	Chevallier Street / Norwich Road	Double Mini-Roundabouts Reduction in sat flows to account for modified design of mini roundabouts at nodes 20026 to 20027

4.7.2 Transport infrastructure associated with key committed/allocated developments has also added to the model network to ensure the proposals are adequately assessed. The bullet point list summarises the 4 most significant schemes which are then considered in detail in the following paragraphs.

- Adastral Park
- Futura Park
- Ipswich Fringe Site – Wolsey Grange
- Ipswich Garden Suburb

ADASTRAL PARK

4.7.3 Documentation related to the formal planning application for Adastral Park, produced in 2009 by David Lock Associates (DLA), submitted to Suffolk Coastal District Council was obtained. The changes made to the network are shown in Table 4-8.

Table 4-8 Adastral Park network amendments

JUNCTION	CHANGE MADE	SOURCE
A12 / Barrack Square / Eagle Way	Changed from roundabout to signalised junction	DLA drawing BTP012 - 023
Barrack Square / Gloster Road	Changed from priority junction to signalised junction	DLA drawing BTP012 - 023
A12 / Foxhall Road	Changed from roundabout to signalised junction	DLA drawing BTP012 - 024
Newbourne Road / Ipswich Road access	Priority junction	DLA drawing BTP012 - 023
Newbourne Road / Hunters Heath access	Priority junction	DLA drawing BTP012 - 024
Internal site network	As per access & circulation plan	DLA drawing BTP012 – 018 - C

FUTURA PARK

4.7.4 The Design & Access statement, naming the site as “Land West of Ransomes Way” produced by Aquigen (Nacton) LLP as part of the September 2011 planning application was obtained for this development. The indicative masterplan was used to code the internal network to the site, with the A1189 Ransomes Way / Central Avenue / James Bennett Avenue changed and coded as a four arm roundabout.

IPSWICH FRINGE – WOLSEY GRANGE

4.7.5 A priority access junction was added to the network on the A1071 at Poplar Lane.

IPSWICH GARDEN SUBURB

4.7.6 Following the indicative masterplan contained within the Ipswich Garden Suburb Supplementary Planning Document (SPD) a simple indicative internal road network was coded into the model to replicate the routing of trips through the suburb. In addition walking and cycling connections and public transport proposals were added to the demand model.

5 METHODOLOGY

5.1 INTRODUCTION

5.1.1 This sections sets out the methodology used and assumptions made in the assessment of the core strategy proposals. This includes the process for running the Emme demand model, generation of matrices using the assumptions set out in Section 4 and the link from the Emme demand model to the SATURN Highway Assignment Model.

5.2 VARIABLE DEMAND MODELLING

5.2.1 Suffolk County Council's ITAMS was used for undertaking variable demand modelling, as it was used to support a major scheme business case submission in 2008 and was reviewed and agreed by both the Department for Transport (DfT) and the Highways Agency.

5.2.2 The ITAMS demand model uses a 24 hour demand matrix for highway, bus and active modes to estimate trip matrices for the AM, IP, PM and OP periods using various fixed factors. The highway trip matrices are converted to hourly matrices (peak hour for the AM and PM, average hour for the IP and OP) and are assigned to produce revised highway travel costs that are fed back into the demand models (trip frequency, active mode choice, time period choice, mode choice, trip distribution and parking choice) to produce revised trip matrices and travel costs for the next iteration until the convergence criteria are met or the maximum number of iterations is reached.

5.2.3 The 2031 forecasts required the estimation of 24 hour demand matrices for all modes (highway, bus and active modes). The procedure used to derive the future demand matrices was as follows:

- NTEM 6.2 production and attraction forecasts by mode and trip purpose for the model time periods (AM IP, PM and OP) were obtained for the forecast year by applying alternative planning assumptions (household and job numbers, excluding specifically assessed development) within TEMPro based on the Local Plan assumptions set out in section 4;
- Growth factors were then derived from the 2008 base year (by mode, purpose, time period and forecast year) to represent background growth. This was carried out separately for the Ipswich, Suffolk Coastal, Mid Suffolk, Babergh, rest of Suffolk and rest of the East of England NTEM areas so that overall growth was constrained to the alternative planning assumption forecasts for these areas;
- The background NTEM growth factors were then applied to base year 24 hour demand trip zone movements within the Ipswich, Suffolk Coastal, Mid Suffolk, Babergh, rest of Suffolk and rest of the East of England areas.
- NTEM production and attraction trip rates (by mode, purpose, time period and forecast year) were applied to the numbers of households and jobs for each specifically assessed development site.
- Development trip ends were then distributed according to the distribution of trips in the base matrices and added to form the forecast matrices;
- The time periods, purposes and modes were then summed to produce forecast 24 hour NTEM demand matrices by the model demand segments. Base year proportions were used to sub-divide the bus and active mode matrices into car available and non-car available households;

→ The 2008 base year HGV and LGV highway user class matrices were factored to the forecast year using Road Transport Forecasts 2013, DfT vehicle-km forecasts for Other Urban roads in the East of England

5.3 SPECIFICALLY ASSESSED DEVELOPMENT TRIPS

5.3.1 Using the development site details provided by SCC and IBC as set out in section 4, NTEM production and attraction trip rates for Ipswich (by mode, purpose, time period and forecast year) were applied to the numbers of households and jobs for each development site. The NTEM trip rates are summarised in Table 5-1.

Table 5-1 2031 NTEM Trip Rates

Mode / Purpose	Residential (Trips/household/day)		Employment (Trips/job/day)	
	Production	Attraction	Production	Attraction
Car				
Commuting	0.575	0.000	0.107	0.632
Other	1.182	0.249	0.240	1.146
Education	0.198	0.000	0.023	0.216
Business	0.067	0.000	0.091	0.146
Bus				
Commuting	0.039	0.000	0.004	0.091
Other	0.078	0.015	0.020	0.128
Education	0.050	0.000	0.002	0.111
Business	0.001	0.000	0.002	0.008
Active (walk & cycle)				
Commuting	0.108	0.000	0.043	0.139
Other	0.573	0.118	0.179	0.629
Education	0.185	0.000	0.018	0.176
Business	0.006	0.000	0.018	0.021

5.3.2 The total number of proposed specifically assessed development trips for the residential and commercial developments is summarised in Table 5-2. Appendix B contains details of the trip generation for each individual development.

Table 5-2 Total Specifically Assessed Development Trips

Mode / Purpose	Residential (Trips/day)				Employment (Trips/ day)			
	Production		Attraction		Production		Attraction	
Car	28,569	66%	3,516	65%	11,894	62%	55,253	62%
Bus	2,385	6%	211	4%	732	4%	8,730	10%
Active (walk & cycle)	12,318	28%	1,664	31%	6,640	34%	24,935	28%
Total	**43,272**	**100%**	**5,391**	**100%**	**19,266**	**100%**	**88,918**	**100%**

5.3.3 The majority of developments were loaded into an existing model zone (using existing access pints), with new zones added to the network for Adastral Park and Futura Park. The distribution for traffic related to the proposed development was taken from the existing model zone it was located within, if applicable, and adjacent zones where the land use appeared similar following checks using satellite imagery. Additionally, in the updating of the SATURN model for the Wet Dock Crossing scheme testing some of the zones were disaggregated into smaller zones to enable more detailed loading of trips to the network.

5.4 TEMPRO GROWTH FACTORS

5.4.1 TEMPro factors were derived from NTEM version 6.2 to represent background transport growth. The underlying TEMPro planning data was adjusted by removing the committed development housing and job trip totals that had been modelled explicitly to create adjusted TEMPro growth factors. The adjusted factors represent the background growth in 24 hour demand by each modelled mode of transport and trip purpose between 2008 and 2031. Adjustments were also made to the planning data for counties and regions outside of the model study area relevant to the location of zones at the periphery of the model network.

5.4.2 The adjustments made to the local authority planning data are shown in Table 5-3. The local plan assumptions relate to the trip ends generated by the alternative planning assumptions set out in section 4. The specifically assessed development trip ends are trips generated by the specifically assessed development and are consistent with Table 5.2. The 'Adjusted Planning Data' is the Local Plan assumption trip ends with the specifically assessed development trips removed.

Table 5-3 TEMPro 2031 Trip End Data Adjustments (Daily, All Modes & Purposes)

Area	Local Plan Assumptions		Specifically Assessed Development		Adjusted Planning Data	
	Productions	Attractions	Productions	Attractions	Productions	Attractions
Ipswich	285100	322861	37993	41214	247107	281647
Suffolk Coastal	260734	258656	15489	31338	245245	227318
Mid Suffolk	191938	171435	2371	876	189567	170559
Babergh	173826	187940	6685	20881	167141	167059
Rest of Suffolk	1185585	1214704	0	0	1185585	1214704
Rest of East of England	11125135	11353723	0	0	11125135	11353723

5.4.3 The adjustments to the 2031 planning data led to the differences shown in Table 5-4 when compared to the 2008 TEMPro planning data. The 2008 and 2031 alternate planning data assumptions are consistent with Table 4.3 of this report.

Table 5-4 TEMPro Planning Data Comparison

Area	2008 Alternate Planning Assumptions		2031 Alternate Planning Assumptions		Difference (2008 to 2031)	
	Productions	Attractions	Productions	Attractions	Productions	Attractions
Ipswich	228866	279650	247107	281647	18241	1997
Suffolk Coastal	214456	196624	245245	227318	30789	30694
Mid Suffolk	158002	127743	189567	170559	31565	42816
Babergh	151498	151331	167141	167059	15643	15728
Rest of Suffolk	968918	990979	1185585	1214704	216667	223725
Rest of East of England	9189570	9191083	11125135	11353723	1935565	2162640

5.4.4 The adjusted TEMPro production and attraction growth factors for the 2008 to 2031 period are shown below in Table 5-5. These factors were used to factor up the 2008 matrix to 2031 background traffic levels. Each zone within the ITAMS was assigned to one of the areas in Table 5-5 with the relevant factors used for the zone as an origin and destination point. The car factors were used for the car driver user classes (UC3 to UC5).

Table 5-5 Adjusted TEMPro Growth Factors – 2008 to 2031

Area	Productions	Attractions
Car		
Ipswich	1.103	1.020
Suffolk Coastal	1.144	1.159
Rest of Suffolk	1.250	1.263
Rest of East of England	1.218	1.243
Bus		
Ipswich	1.020	0.973
Suffolk Coastal	1.113	1.125
Rest of Suffolk	1.164	1.147
Rest of East of England	1.170	1.208
Active (walk & cycle)		
Ipswich	1.042	0.992
Suffolk Coastal	1.147	1.152
Rest of Suffolk	1.194	1.183
Rest of East of England	1.202	1.224

5.4.5 The background growth factors are calculated based upon assumptions on population, employment, households by car ownership and trip ends within the national trip end model that remain once the alternate planning assumptions have been accounted for. Theses are factors which would lead to an increase in trips by 2031 independently of any growth in development.

5.5 NRTF FACTORS

5.5.1 National Road Traffic Forecasts (NRTF) for the 2013 DfT National Transport Model were used to obtain growth factors for the LGV and HGV elements of the matrix (based on the East of England area) shown in Table 5-6.

Table 5-6 NRTF Growth Factors – 2008 to 2031

Area	LGV Factor	HGV Factor
East of England	1.531	1.150

5.6 MATRIX DEVELOPMENT

5.6.1 The final matrices used for testing the 2031 core strategy were derived through the use of the Emme demand model, as described in Technical Note 1: ITAMS Demand and Public Transport Modelling that can be found in Appendix C.

5.6.2 These matrices were then run through the SATURN model to provide the model runs upon which the highway network analysis is based.

5.6.3 Details of the matrix totals in the AM and PM peaks for the single lane gyratory scenario are shown below in Table 5-7 and Table 5-8.

Table 5-7 AM Peak 2031 Matrix Total Trips (Single Lane Gyratory)

User Class	2008 Base Matrix (TRIPS)	2031 Matrix (TRIPS)	2008 to 2031 % Growth Trips
UC1 – HGV	3365	3850	14.4%
UC2 – LGV	3484	5315	52.6%
UC3 – Car commuting	13795	17423	26.3%
UC4 – Car other	14680	21369	45.6%
UC5 – Car employers business	2542	3259	28.2%
Total	**37866**	**51215**	**35.3%**

Table 5-8 PM Peak 2031 Matrix Total Trips (Single Lane Gyratory)

User Class	2008 Base Matrix (TRIPS)	2031 Final Matrix (TRIPS)	2008 to 2031 % Growth Trips
UC1 – HGV	2012	2303	14.5%
UC2 – LGV	2942	4490	52.6%
UC3 – Car commuting	15000	18824	25.5%
UC4 – Car other	16418	23233	41.5%
UC5 – Car employers business	2800	3563	27.2%
Total	**39171**	**52412**	**33.8%**

5.6.4 Details of the matrix totals in the AM and PM peaks for the two lane gyratory scenario are shown in Table 5-9 and Table 5-10 below.

Table 5-9 AM Peak 2031 Matrix Total Trips (Two Lane Gyratory)

User Class	2008 Base Matrix (TRIPS)	2031 Matrix (TRIPS)	2008 to 2031 % Growth Trips
UC1 – HGV	3365	3850	14.4%
UC2 – LGV	3484	5315	52.6%
UC3 – Car commuting	13795	17444	26.5%
UC4 – Car other	14680	21379	45.6%
UC5 – Car employers business	2542	3263	28.3%
Total	**37866**	**51251**	**35.4%**

Table 5-10 PM Peak 2031 Matrix Total Trips (Two Lane Gyratory)

User Class	2008 Base Matrix (TRIPS)	2031 Final Matrix (TRIPS)	2008 to 2031 % Growth Trips
UC1 – HGV	2012	2303	14.5%
UC2 – LGV	2942	4490	52.6%
UC3 – Car commuting	15000	18829	25.5%
UC4 – Car other	16418	23246	41.6%
UC5 – Car employers business	2800	3563	27.3%
Total	**39171**	**52431**	**33.9%**

5.6.6 Table 5-7 to Table 5-10 demonstrate very little variation between the two scenarios with regard to growth in highway trips in the SATURN network area, with the single lane gyratory slightly reducing total car trips which is expected given the reduced highway capacity.

5.7 SATURN VERSION

5.7.1 SATURN version 11.3.12F + UPDATE 1, the latest version available to WSP | Parsons Brinckerhoff was used for assigning the 2031 forecast matrices as described above and is consistent with the updated Wet Dock Crossing Model.

5.8 GENERALISED COST PARAMETERS

5.8.1 The original forecast 2021 model provided to WSP | Parsons Brinckerhoff included the same generalised costs in 2021 as 2008. The model has been updated to include specific forecast generalised costs for 2031.

5.8.2 Generalised cost is defined in keeping with the guidance in section 2.8 of WebTAG Unit M3.1, and is as follows:

$$Generalised\ cost = Time + \left(\frac{Vehicle\ operating\ cost}{Value\ of\ time}\right) Distance$$

5.8.3 Value of time is calculated in pence per minute (PPM) and vehicle operating cost is calculated in pence per kilometre (PPK). The adopted parameters were calculated from the TAG databook published in November 2014, since this is the version used for the Wet Dock scheme testing.

5.8.4 The parameters adopted are shown in Appendix D. For the HGV class, local ATC data (2015) was used to determine the split of vehicles which could be classified as OGV1 and OGV2 by peak hour. This split was used to calculate average generalised cost parameters for HGVs.

6 MODEL OUTPUTS

6.1 INTRODUCTION

6.1.1 This section provides an assessment of the model output data in terms of convergence, network summary statistics and junction capacity assessments to assess the impact of the plan proposals on the highway network.

6.2 CONVERGENCE

6.2.1 Model assignment of trips to the highway network is undertaken using a standard approach based on a 'Wardrop User Equilibrium', which seeks to minimise travel costs for all vehicles in the network. The Wardrop User Equilibrium is based on the following proposition:

"Traffic arranges itself on congested networks such that the cost of travel on all routes used between each origin-destination pair is equal to the minimum cost of travel and unused routes have equal or greater costs."

6.2.2 The Wardrop User Equilibrium as implemented in SATURN is based on the 'Frank-Wolfe Algorithm', which employs an iterative process. This process is based on successive 'All or Nothing' iterations, which are combined to minimise an 'Objective Function'. The travel costs are recalculated after each iteration and compared to the previous iteration. The process is terminated once successive iteration costs have not changed significantly. This process enables multi-routeing between any origin-destination pair.

6.2.3 An element of calibrating the model is ensuring that a satisfactory convergence is achieved. Model convergence is needed to ensure traffic flows remain stable between successive iterations of the model.

6.2.4 In accordance with criteria set out in WebTAG Unit M3.1 (January 2014), the parameters %Flow, %GAP and Delta (δ) have been monitored to determine the level of convergence. %Flow measures the proportion of links in the network with flows changing by less than 1% from the previous iteration. δ is the difference between costs on chosen routes and costs on minimum cost paths. %GAP is a generalisation of the δ function to include the interaction effects within the simulation.

6.2.5 The convergence criteria used to assess when a model is considered to have converged is shown in Table 6-1.

Table 6-1 Convergence criteria

MEASURE OF CONVERGENCE	WEBTAG TABLE 4
'Delta' and %GAP	Less than 0.1% or at least stable with convergence fully documented and all other criteria met
Percentage of links with flow change < 1%	Four consecutive iterations greater than 98%
Percentage of links with cost change < 1%	Four consecutive iterations greater than 98%
Percentage change in total user costs	Four consecutive iterations less than 0.1%

Source: WebTAG Unit M3.1, Section 3, Table 4, January 2014

6.2.6 WebTAG M3.1 indicates that delta (δ) and %GAP values of less than 0.1% is the most fundamental indicator of model convergence and should be achieved as a minimum.

6.2.7 Upon review of the model output, a number of scenarios had reached the maximum iterations without reaching the 98% of links with flow change of <1% but with all other convergence criteria met. A detailed review of the change in model flows was undertaken to understand why this occurred and demonstrated no significant changes in flow between model iterations. The slightly lower percentage is caused by changes to links with very low flows predominantly on low flow zones with multiple centroid connectors.

6.2.8 This issue cannot be resolved without significant modification to the Saturn and demand model and is not considered to be significant on model operation given the very low flow changes involved. The convergence criterion has therefore been reduced to 97% to aid model convergence. On balance it is considered the lower setting therefore ensures a suitable level of convergence given all other convergence parameters are exceed and enables all model periods to converge.

6.2.9 Appendix E presents the final 6 iterations of the model runs, showing convergence against the criteria set out above and demonstrates all models pass the criteria.

6.3 OVERALL NETWORK PERFORMANCE

6.3.1 Network performance statistics give an indication of the overall network stress between different models, and can provide an understanding of how the network is performing relative to the traffic demand. The 2031 forecast models have been compared to the 2008 base year in order to assess the impact on network performance in 2031.

6.3.2 The key metrics output from SATURN are over-capacity queues (pcu-hrs), total travel time (pcu-hrs), travel distance (pcu-kms), average speed (kph), and total trips loaded (pcus).

6.3.3 Section 17.8 of the SATURN manual provides definitions of these metrics. Over-capacity queues are defined as “the extra time spent in queues at over-capacity junctions waiting for the cycle in which the vehicle exits”. Total travel time is “the sum of both link and junction times”. Travel distance is defined as the pcu-kms (Passenger Car Unit – kilometres) on simulation links. Average speed is defined by (total distance) / (total time).

6.3.4 Section 17.9.1 of the SATURN manual defines “total trips loaded” as the sum of all outbound trips which depart from origin zones within that time period, in effect the sum of all trips in the (demand) trip matrix. However, it excludes any trips associated with unconnected O-D pairs (e.g where a zone has only in-bound centroid connectors in the network but has out-bound trips in the trip matrix) and all intra-zonal trips. It is also the “demand” total as opposed to the “actual” total which might be calculated as the sum of all actual flows on an in-bound centroid connectors to destination zones.

6.3.5 The overall network performance for the Single Lane Star Lane gyratory scenario is compared for both the AM and PM peaks in Table 6-2 and Table 6-3 respectively.

Table 6-2 AM peak network performance comparison (Single Lane Star Lane Gyratory)

Summary Statistic	2008 AM	2031 AM
Over-capacity queues (pcu.hrs)	26	651
Time spent in over-capacity queues (seconds per trip)	2.5	48
Total travel time (pcu.hrs)	8900	13354
Average Travel Time Per Journey (minutes)	14.1	15.6
Travel distance (pcu.kms)	381945	496028
Average speed (kph)	43 (27 mph)	37 (23 mph)
Total trips loaded (pcus)	37866	51215.3

Table 6-3 PM peak network performance comparison (Single Lane Star Lane Gyratory)

Summary Statistic	2008 PM	2031 PM
Over-capacity queues (pcu.hrs)	27	804
Time spent in over-capacity queues (seconds per trip)	2.5	55
Total travel time (pcu.hrs)	8190	12699
Average Travel Time Per Journey (minutes)	12.5	14.5
Travel distance (pcu.kms)	370971	484878
Average speed (kph)	45 (28 mph)	38 (24 mph)
Total trips loaded (pcus)	39171	52412

6.3.6 Both peaks show an increase in trips between 2008 and 2031, and an associated increase in the total travel time and travel distance due to the increase number of vehicles on the road. The increased flow leads to congestion evidenced by a decrease in average speed across the network (a difference of 3-4 miles per hour) and substantial increases in time spent in over-capacity queues. As a result average travel time per vehicle increases by 90 seconds in the morning peak and 120 seconds in the evening peak.

6.3.7 The overall network performance for the Two Lane Star Lane gyratory scenario is compared for both the AM and PM peaks in Table 6-4 and Table 6-5 respectively.

Table 6-4 AM peak network performance comparison (Two Lane Star Lane Gyratory)

Summary Statistic	2008 AM	2031 AM
Over-capacity queues (pcu.hrs)	26	581
Time spent in over-capacity queues (per trip) (seconds)	2.5	41
Total travel time (pcu.hrs)	8900	13218
Average Travel Time Per Journey (minutes)	14.1	15.5
Travel distance (pcu.kms)	381945	495237
Average speed (kph)	43 (27 mph)	38 (24 mph)
Total trips loaded (pcus)	37866	51251

Table 6-5 PM peak network performance comparison (Two Lane Star Lane Gyratory)

Summary Statistic	2008 PM	2031 PM
Over-capacity queues (pcu.hrs)	27	800.4
Time spent in over-capacity queues (per trip) (seconds)	2.5	55
Total travel time (pcu.hrs)	8190	12669.7
Average Travel Time Per Journey (minutes)	12.5	14.5
Travel distance (pcu.kms)	370971	485004
Average speed (kph)	45 (28 mph)	38 (24 mph)
Total trips loaded (pcus)	39171	52430.7

6.3.8 Both peaks show an increase in trips between 2008 and 2031, and an associated increase in the total travel time and travel distance due to the increase number of vehicles on the road. The increased flow leads to congestion evidenced by a decrease in average speed across the network (a difference of 3-4 miles per hour) and substantial increases in time spent in over-capacity queues. As a result average travel time per vehicle increases by 84 seconds in the morning peak and 120 seconds in the evening peak.

6.3.9 Table 6-2 to Table 6-5 illustrate there is limited difference between the two scenarios, with the two lane star lane gyratory having slightly reduced time spent in over capacity queues and total travel time.

6.4 JUNCTION CAPACITY ASSESSMENT

6.4.1 The volume to capacity (V/C) percentage is considered in order to determine locations in the network which experience the most congestion. Each turning movement within the model has a capacity of PCUs per hour defined. The assigned model flow is the volume of traffic in PCUs per hour, with the V/C percentage calculated as the volume relative to the capacity in percentage terms that can make that movement.

6.4.2 V/C percentages above 100% show a junction / approach / turn which experiences a traffic flow beyond its capacity. These locations show the greatest network stress and suggest delays are likely. At these locations the network may cease to function efficiently and blocking back from queuing may occur, constraining the capacity and causing congestion on adjacent links and junctions. Locations at which the V/C percentage is between 90-99% are also considered likely to experience congestion and are highlighted within the analysis. Table 6-6 outlines the V/C percentage bands which are considered within this report.

Table 6-6 V/C percentage bands

DESCRIPTION	V/C PERCENTAGE BAND
Significant	**100% +**
Potentially Significant	**90 – 99%**

6.4.3 Turn based V/C was considered for analysis rather than overall junction V/C, this means all turns and approaches to junctions were analysed. Considering only the average V/C for the overall junction risks not highlighting junctions where there is potential significant delay. For example at a junction where three out of four approaches perform well with a V/C well below 90%, but the remaining approach experiences delay problems with a V/C over 100%. This situation may not be highlighted as an issue if the overall average V/C at the junction falls to a level below 90%.

6.4.4 V/C performance is presented in this report for junctions in terms of the worst performing turn at the junction i.e. if one turn at a junction has an overall V/C of 101%, and another has a turn with a V/C of 105%, the junction will be assigned the value of 105% in terms of its maximum V/C value. A filter was set to only consider turns of 500 PCUs per hour or greater to ensure only the major flows experiencing significant delay are considered.

6.4.5 The following paragraphs should be read alongside the maps contained in Appendix G. The results in tables 6.7 – 6.10 have each been mapped.

6.4.6 Table 6-7 shows the junctions with a worst performing turn / arm greater than 100% in both peaks, and in which at least one arm has a flow of over 500 PCU per hour when the Star Lane gyratory is two lanes. It is these junctions which can be considered to cause the greatest traffic issues and thus most likely to need possible mitigation. The 2008 V/C results are presented for context and to identify if the junction is already close to or exceeding its capacity.

Table 6-7 2031 V/C junction performance – Both peak V/C 100%+ (Two Lane Star Lane Gyratory)

Node	Junction	AM Peak		PM Peak	
		2008 V/C	2031 V/C	2008 V/C	2031 V/C
10007	College Street / Star Lane / Greyfriars Road	101	103	76	101
20014	A1214 / A137 / A1071 / Yarmouth Road	89	101	98	102
20048	A1214 / Tuddenham Road	88	102	100	101
30044	A14 off slip / A1214 (Copdock)	100	110	99	108
30047	A1214 / A14 on slip (Copdock)	100	100	100	101
30049	A14 / A12 (Copdock) - Eastbound Merge	78	108	69	104
30124	A1156 / Old Norwich Road	98	104	95	105
30150	A1071 / Hadleigh Road	62	101	68	102
30296	A1214 / A1189 Heath Rd / Woodbridge Rd East	65	101	64	101
30407	A1214 / A12 - Park and Ride	101	100	91	101
30794	A1214 / A14 on slip (Copdock)	31	105	35	105
30822	Hadleigh Road / Allenby Road	93	100	100	104
70043	Station Street/ Wherstead Road	47	105	40	102

6.4.7 Multiple sections of the Copdock Interchange (A14 Junction 55) are shown to have significant congestion problems with maximum V/C over 100% in both peak hours and both scenarios.

6.4.8 A1156 / Old Norwich Road (node 30124), A1214 / Tuddenham Road (node 20048), and A1214 / A12 Park and Ride (node 30407) already experience potentially significant stress and therefore it is not surprising that they would experience further stress in 2031.

6.4.9 Table 6-8 provides equivalent data for a single lane Star Lane gyratory.

Table 6-8 2031 V/C junction performance – Both peak V/C 100%+ (One Lane Star Lane Gyratory)

Node	Junction	AM Peak		PM Peak	
		2008 V/C	2031 V/C	2008 V/C	2031 V/C
10007	College Street / Star Lane / Greyfriars Road	101	103	76	101
20014	A1214 / A137 / A1071 / Yarmouth Road	89	101	98	102
20048	A1214 / Tuddenham Road	88	102	100	101
20077	Caudwell Hall Rd / Foxhall Rd	91	101	79	100
30044	A14 off slip / A1214 (Copdock)	100	111	99	108
30047	A1214 / A14 on slip (Copdock)	100	100	100	101
30049	A14 / A12 (Copdock) - Eastbound Merge	78	106	69	104
30124	A1156 / Old Norwich Road	98	101	95	105
30150	A1071 / Hadleigh Road	62	102	68	101
30217	Wherstead Road / Hawes Street / Virginia Street Roundabout	31	103	29	101
30296	A1214 / A1189 Heath Rd / Woodbridge Rd East	65	102	64	101
30407	A1214 / A12 - Park and Ride	101	101	91	101
30794	A1214 / A14 on slip (Copdock)	31	105	35	105
30822	Hadleigh Road / Allenby Road	93	100	100	104
70043	Station Street / Wherstead Road	47	104	40	101

6.4.10 It can be seen that between the two scenarios most of the junctions affected are the same. In the one lane gyratory scenario the following additional junctions match the criteria:

- → Caudwell Hall Rd / Foxhall Rd (node 20077)
- → Wherstead Road / Hawes Street / Virginia Street Roundabout (node 30217)

6.4.11 Table 6-9 shows the junctions with a performance between 90% and 100% in both peaks in 2031, and in which at least one arm has a flow of over 500 PCU when the Star Lane gyratory is two lanes. These junctions can also be considered as potentially significant.

Table 6-9 2031 V/C junction performance – Both peak V/C 90 – 99% (Two Lane Star Lane Gyratory)

Node	Junction	AM Peak		PM Peak	
		2008 V/C	2031 V/C	2008 V/C	2031 V/C
10020	A1156 St Margaret's Street / Helen's Street B1075	81	95	92	98
10030	A1156 / High Street / Museum Street	85	94	84	99
20044	A1214 / Henley Road	92	97	94	93
20047	A1214 / B1077 (Westerfield Road / Valley Road)	72	92	95	100
20069	B1057 / Grove Ln / Warwick Rd	95	95	87	96
30032	A14 / Sproughton Road - SB Merge	70	96	72	94
30063	A14 / A137 - Eastbound Merge (Wherstead interchange)	72	93	78	90
30114	A12 / A1214 - A12 NB Entry (Copdock)	97	95	92	100
30221	A137 (between A14 J56 & Wherstead Road)	76	99	61	98
70315	Hawes Street Ped Crossing	69	93	65	98

6.4.12 Table 6-10 provides equivalent data for a single lane Star Lane gyratory.

Table 6-10 2031 V/C junction performance – Both peaks V/C 90 – 99% (One Lane Star Lane Gyratory)

Node	Junction	AM Peak		PM Peak	
		2008 V/C	2031 V/C	2008 V/C	2031 V/C
10020	A1156 St Margaret's Street / Helen's Street B1075	81	95	92	96
10030	A1156 / High Street / Museum Street	85	94	84	99
20044	A1214 / Henley Road	92	96	94	92
30032	A14 / Sproughton Road - SB Merge	70	95	72	94
30063	A14 / A137 - Eastbound Merge (Wherstead interchange)	72	97	78	91
30114	A12 / A1214 - A12 northbound Entry (Copdock)	97	95	92	100
30253	A1156 / A1189 / Bucklesham Road	51	94	59	99
70315	Hawes Street Ped Crossing	69	97	65	99

6.4.13 It can be seen that between the two scenarios most of the junctions affected are the same. In the single lane gyratory scenario the following additional junctions match the criteria:

- → A1156 / A1189 / Bucklesham Road (node 30253)

6.4.14 In the two lane gyratory scenario the following junctions match the criteria which don't in the single lane gyratory scenario:

- A1214 / B1077 (Westerfield Road / Valley Road) (node 20047)
- B1057 / Grove Ln / Warwick Rd (node 20069). It can be seen that in 2008 this is showing problems.
- A137 (between A14 J56 & Wherstead Road) (node 30221)

6.4.15 A1156 / A1189 / Bucklesham Road (node 30253) can be seen to experience significant increase in stress when compared to 2008, although still operates at less than100%.

6.4.16 A number of A14 slip roads including A14 / Sproughton Road southbound Merge (Node 30032) are also predicted to be close to capacity given the expected increase in demand along these routes.

6.4.17 Appendix F provides further V/C results, showing junctions where at least one peak meets the criteria. These tables split out the results to show those junctions where in one peak the V/C is between 90 – 99% separately from those junctions where the V/C is above 100%. However if a junction is over 100% in one peak and 90 – 99% in another it will appear on both sets of tables. Each scenario is considered separately.

6.5 SUMMARY

6.5.1 This section provides analysis of convergence, network summary statistics and V/C ratios of all the scenarios considered in this assessment.

6.5.2 This analysis has demonstrated that by 2031 there would be a substantial increase in time spent in over capacity queues, total travel time, and total travel distance in 2031. The increase in travel time and distance can in part be attributed to the increase in number of trips. When considered as an impact of each trip it can be seen this equates to an average travel time per vehicle of 90 seconds in the morning peak and 120 seconds in the evening peak for the single lane gyratory, reducing to 84 seconds in the morning peak and 120 seconds in the evening peak for the two lane gyratory.

6.5.3 V/C junction performance assessments have identified a number of junctions which would see increased pressure and operate in excess of capacity in all time periods. Impacts at some of these junctions are summarised below. Impacts at Tuddenham Road junction appear to be related in part to Ipswich Garden Suburb, while congestion issues at the other junctions highlighted are more difficult to attribute to specific sites, but the impact is likely to be a result of the combined impact of background traffic growth and planned and committed development.

COPDOCK INTERCHANGE

6.5.4 Multiple sections of the Copdock Interchange (A14 Junction 55) are shown to have significant congestion problems in 2031 with maximum V/C over 100% in both peak hours and both scenarios, including in the following:

- Eastbound off-slip / A1214 northbound / circulatory
- A1214 prior to segregated left turn to A14 eastbound on-slip
- A1214 / A14 eastbound on-slip / circulatory

STAR LANE GYRATORY

6.5.5 Within Ipswich town centre, the western end of the Star Lane gyratory shows significant congestion problems, namely the Star Lane / College Street / Bridge Street / Grey Friars Road roundabout.

YARMOUTH ROAD

6.5.6 The junction of A1214 / A137 / A1071 / Yarmouth Road (node 20014) is also shown to experience significant congestion problems in both peaks and in both scenarios in 2031. This is also a junction known to experience issues at present.

A1214 / TUDDENHAM ROAD AND A1214 / HENLEY ROAD

6.5.7 These junctions are south of the of the proposed Ipswich Garden Suburb development and would experience increases in congestion in the morning peak, in part as a result of the proposed development levels on the site and increased traffic volumes into Ipswich town centre.

A1071 / HADLEIGH ROAD

6.5.8 This junction experiences significant additional congestion as a result of increases in traffic levels, in part caused by traffic using Hadleigh Road in preference to the A1214 due to congestion on the route into the town centre.

HADLEIGH ROAD / ALLENBY ROAD

6.5.9 This junction experiences increases in congestion, however upon further inspection this as a result of un-adjusted signal timings on the Sainsbury's access in the model. In practice, the impact at this junction is therefore not considered significant.

A1214 / A1189 HEATH RD / WOODBRIDGE RD EAST

6.5.10 This junction experiences significant increases in V/C in the forecast year model. This cannot be directly correlated to any specific development proposal, but is impacted by the combination of planned development and background traffic growth.

WHERSTEAD ROAD / HAWES STREET / VIRGINIA STREET ROUNDABOUT AND STATION STREET / WHERSTEAD ROAD

6.5.11 These junctions experience significant increases in flow as a result of the proposed Wet Dock Crossing. These will be assessed as part of that study and during the next stage identify mitigation / revised junction layouts. These have not been included within this assessment as the extent is not known at this stage. The impacts at these junctions are not therefore considered to be associated to the Local Plan.

7 CONCLUSIONS

7.1 SUMMARY

7.1.1 The transport modelling shows there is likely to be a significant increase in congestion by 2031 when compared to the model's baseline of 2008. This growth in traffic is a result of changing patterns of travel behaviour and predicted future growth in housing and jobs in and around Ipswich. Transport modelling factors in an element of growth when predicting future traffic impacts and has been adapted for the purposes of this assessment to consider the specific growth locations identified in the Ipswich Local Plan. The results cannot therefore be interpreted as simply as 'Local Plan vs no Local Plan', i.e. it could not reasonably be assumed that if there were no Local Plan traffic patterns would be the same in 2031 as they were in 2008, 2011 or 2015.

7.1.2 Two scenarios were considered – a two lane gyratory or a single lane gyratory on Star Lane. The results from the modelling show there are a large number of locations at which there are already congestion problems. This occurs because much of the network is unchanged from the 2008 base year model and mitigation to address an increase in traffic has not been identified, in the model, for many locations. The analysis has identified several junctions in both scenarios which would experience significant congestion issues. Many of these are junctions which are already experiencing problems.

7.1.3 In particular A14 Junction 55 (Copdock Interchange) is shown to experience substantial congestion and delay with multiple parts of the junction exceeding capacity, irrespective of the scenario. This should be expected given the extensive existing congestion at the junction.

7.1.4 A number of locations in and around Ipswich town centre are also shown to exceed capacity in both peaks, including sections of the Star Lane gyratory. This is similar in both scenarios since the single lane scenario allows for the redistribution of traffic away from this area and thus an opportunity to prioritise other modes, especially walking and cycling, within the area.

7.1.5 The impact of the Ipswich Garden Suburb also adds additional congestion to the north of Ipswich due to the increased traffic volumes. While the impacts are not considered severe, there are clearly increased congestion levels at some of the local junctions.

7.1.6 This analysis has demonstrated that there will be a substantial increase in over capacity queues, total travel time, and total travel distance in 2031. The increase in travel time and distance can in part be attributed to the increase in number of trips. When considered as an impact of each trip it can be seen this equates to an average travel time per vehicle of 90 seconds in the morning peak and 120 seconds in the evening peak for the single lane gyratory, reducing to 84 seconds in the morning peak and 120 seconds in the evening peak for the two lane gyratory.

7.2 MITIGATION

7.2.1 A mitigation scenario has not been considered at this point of assessment. This is because the analysis has demonstrated that the key junctions impacted on by the proposals are junctions and locations that are currently being assessed by Suffolk County Council under separate studies.

7.2.2 As part of these studies, further analysis will be carried out at specific junctions using detailed junction modelling to understand the nature of the capacity problems at the specific junctions highlighted in this report and to identify mitigation proposals.

7.2.3 These current assessments include:

- Ipswich Wet Dock Crossing
- Star Lane Gyratory
- A14 (countywide), including key Ipswich junction modelling
- Northern Ipswich Capacity enhancements

7.2.4 The Ipswich Wet Dock Crossing scheme is being developed to bring a detailed proposal with full business case forward for construction (opening in 2021). It is plausible that in this process a number of junctions or roads will see mitigating measures taken which would undoubtedly also impact the operation of the highway network with respect to the local plan development and improve network performance.

7.2.5 SCC has recently commissioned work into the operation of junctions along the A14, with a view to bringing a number of junctions, those which suffer severe stress, forward for business case to support inclusion in Highways England Road Investment Strategy 2. The outcome of this piece of work may have important consequences for the performance of the highway network as a consequence of development, specifically with congestion problems at the Copdock interchange.

7.2.6 Studies are also currently being conducted into Northern Ipswich Capacity Enhancement and Star Lane gyratory to assess options for improvement which might lead to mitigation measures that impact the operation of the highway network in 2031.

7.2.7 These studies provide confidence that many of the areas of key impact identified within this document are currently being assessed to identify solutions that will help to mitigate them.

7.3 AREAS FOR FURTHER STUDY

7.3.1 A new County Wide Demand and Highway Model is currently being prepared (expected completion September 2016). This county wide model is a full demand model, constructed based upon mobile phone data trip matrices and will have a base year of 2016.

7.3.2 The new model will allow additional transport improvements associated with studies identified in section 7.2 to be included. Further, due to the countywide study area it will enable joint planning with neighbouring authorities.

7.3.3 The impact of specific local plan development sites could be assessed within the model to identify those areas of mitigation that will be required by developers to mitigate their site impacts.

Appendix A

PROPOSED DEVELOPMENTS

RESIDENTIAL DEVELOPMENTS MODELLED

REFERENCE	ADDRESS	DWELLINGS MODELLED
IP200	Replaces 05/00819 and 11/00432 from previous version - Griffin Wharf, Bath Street	231
IP/04/00105/FUL	British Rail Land Wherstead Road Ipswich	73
IP/04/00313/FUL	Redevelopment Sites (Former Cranfields) College Street Ipswich	335
IP/04/00804/FUL	Eastway Business Park Europa Way Ipswich	48
IP/06/01180/REM	20 Jovian Way Ipswich Suffolk	21
IP/09/00264/FUL	Eastway Business Park Europa Way Ipswich Suffolk	9
IP/04/01127/REM	Orwell Junior School Robeck Road Ipswich	37
IP/04/01290/FUL	Parkside Duke Street Ipswich	102
IP/05/00290/FUL	Celestion Bull Motors And Marlows, Foxhall Road Ipswich	2
IP/07/00679/FUL	Celestion Bull Motors And Marlows Ltd Foxhall Road Ipswich Suffolk	26
IP/05/00296/FUL	Pauls Malt Ltd Key Street Ipswich	267
IP/05/00590/FUL	Compair Reavell Ltd Ranelagh Road Ipswich	263
IP/05/00641/FUL	St Helens Court - County Hall St. Helens Street Ipswich	78
IP/06/00087/FUL	Reservoir Site Spring Road Ipswich	24
IP/07/00064/FUL	Churchills PH 560 Bramford Road Ipswich	24
IP/07/00123/FUL	Hayhill Phase 1, Allotments Hayhill Road Ipswich Suffolk	72
IP/09/00612/FUL	Hayhill Phase 2b, Allotments Hayhill Road Ipswich Suffolk	203
IP/09/00579/FUL	Hayhill Phase 2a, Allotments Hayhill Road Ipswich Suffolk	29
IP/07/00190/FUL	Land To The South The Albany Ipswich Suffolk	38
IP/07/00716/FUL	Site Development 333a 335a 365 367 377 379 And 389 Bramford Road Ipswich Suffolk	94
IP/07/00715/FUL	Ravenswood Nacton Road Ipswich Suffolk	35
IP/08/00246/REM	Area S&T, Ravenswood Nacton Road Ipswich Suffolk	95
IP/09/00197/FUL	411 - 417 Bramford Road Ipswich Suffolk	30
IP/09/00787/FUL	Driving Test Centre 243 Woodbridge Road Ipswich Suffolk	42
IP/10/00108/FUL	11 To 15 Bedford Street And Former NCP Car Park 11 St Georges Street Ipswich Suffolk	32
IP/10/00867/FUL	7 - 11 Great Whip Street Ipswich Suffolk	386
IP/11/00980/REM	Thomas Wolsey School 642 Old Norwich Road Ipswich Suffolk	48
IP/10/00935/FUL	V A Marriott Ltd Handford Road Ipswich Suffolk	59
IP/08/00518/FUL	Shed No 7 Orwell Quay Duke Street Ipswich Suffolk	151
13/00368	Former 405 Club, Bader Close	108
13/01073	Western House	50
12/00429	Fire Station, Colchester Road	59
14/00435	Ravenswood U V W	94
14/00920	Russet Road/Woodbridge Road	39
13/00943	Europa Way	94
02/01241 / IP205	Burton's College Street	125
IP132	Bridge Street, Northern Quays (west)	73
14/00310	St Edmund House, Rope Walk	74
13/01110	Eastgate House, Carr Street	25
14/00376	Ulster Avenue	22
14/00587	16-18 Princes Street	33
Allocation	Ipswich Garden Suburb	3500
IP004	Bus Depot, Sir Alf Ramsey Way	48
IP005 & IP032	Tooks Bakery/King George V Playing Field	200
IP006	Co-op Warehouse, Paul's Road	28

IP010a & IP010b	Felixstowe Road	141
IP011b	Smart Street/Foundation Street	50
IP012	Peter's Ice Cream etc, Grimwade Street	29
IP029	Opposite 674-734 Bramford Road	71
IP033	Land at Bramford Road (Stock's site)	46
IP037	Island Site	271
IP039a	Land between Vernon Street and Stoke Quay (west)	43
IP043	Commercial Bldgs & Jewish Burial Ground, Star Lane	50
IP048	Mint Quarter	72
IP052	Land between Lower Orwell Street and Star Lane	29
IP054	Land between Old Cattle Market and Star Lane	28
IP059a	Elton Park Industrial Estate	105
IP061	Lavenham Road	30
IP080	240 Wherstead Road	27
IP098	Transco, south of Patteson Road	51
IP116	St Clement's Hospital Grounds, Foxhall Road	227
IP133	South of Felaw Street	33
IP136	Silo, College Street	48
IP142	Duke Street	26
IP226	Helena Road	540
IP015	West End Road Surface Car Park	22
IP031	Burrell Road	20
IP047	Land at Commercial Road	103
IP089	Waterworks Street	23
IP096	Car Park, Handford Road East	20
15/01041/FUL	Land between Cliff Quay and Landseer Road	222
IP036b	IP036b Shed 7	50
2700/12	Land at the former Scotts/Fisons site, Paper Mill Lane, Bramford	176
3310/14	Land Between Gipping & Bramford Road, Great Blakenham	426
2986/15	Adjacent Playing Field, The Street, Bramford	130
14/01375, 14/01437	Belstead House, Sprites Lane, Pinewood (155 dwellings + 65 bed care home	220
B/15/00993	Land to the north and south of Poplar Lane, Sproughton (CS allocation) (Wolsey Grange)	475
B/11/00745	Land south of Sproughton Primary School, Church Lane, Sproughton	30
C/10/1906	South of Main Road, Martlesham	180
	Adastral Park	2000
C/12/1930	Trinity Park	300
C13/0617	Amberfield School, The Street, Nacton	22
C12/1381	Land at Purdis Farm Lane & Bucklesham Road, Purdis Farm	23
C12/0237	Phase 6,7 & site A, Bixley Farm, Rushmere St Andrew	63
C06/0703	Bixley Farm, Rushmere St Andrew	15
C06/1709	Bixley Farm, Rushmere St Andrew	33
C03/0620	Bixley Farm, Rushmere St Andrew	39
Various	Grange Farm, Kesgrave	204
SSP17	Land south of Lower Road, Westerfield	20
SSP18	Land at Old Station Works, Westerfield	20

COMMERCIAL DEVELOPMENT MODELLED

REFVAL	ADDRESS	PROPOSAL	TOTAL JOBS MODELLED
06/00615/FUL	Land Between A14 And Railway Line Adj Ransomes Nacton Road Ipswich	Erection of car showroom including offices and repair workshop.	54
07/00641/FUL	5 Bailey Close, Ipswich	Conversion of existing social club and vehicle repair depot into six self-contained light industrial/warehouse units (B1/B8). Erection of two new industrial units.	40
08/00025/FUL	24 Knightsdale Road, Ipswich	Change of use from wholesale warehouse (B8) to fire extinguisher assembly and distribution place (B2).	0
06/00378/FUL	Suffolk College Rope Walk Ipswich	Demolition of existing office and education buildings, erection of new 4 storey further education college buildings incorporating sports hall with associated car parking and landscaping, new and altered vehicular and pedestrian access points.	0
06/00838/FUL	Former Eastern Counties Farmers Fore Street Ipswich	Erection of 7 storey education building (Class D1) for University Campus Suffolk and all associated works. (REVISED PLANS RECEIVED)	152
07/00486/REM	Land Between A14 & Railway Line Adj Ransomes, Nacton Road	Erection of 2 and 3 storey building for office and industrial use (Classes B1+ B2) and all ancillary works (offices, car parks etc).	160
07/00738/FUL	Car Park Curriers Lane, Ipswich	Erection of 3-4 storey block of B1 offices (with additional use of A2 ground and part first floor) and all associated works.	70
07/01047/FUL	1 Orwell Retail Park Ranelagh Road Ipswich Suffolk	Erection of front extension, construction of enlarged mezzanine floor, alterations to car park / service yard layout, provision of river walk.	30
07/00488/FUL	Suffolk College Rope Walk Ipswich Suffolk	Erection of new further education building with associated car parking and landscaping, new and altered vehicular and pedestrian access points, amended scheme IP/06/00378/FUL.	400
05/01010/FUL	The Centre Stoke Park Drive Ipswich	Demolish all existing buildings. Erection of 2 and 3 storey buildings (up to 4 storeys including lower ground area) comprising supermarket (Class A1) (4181m2), range of small (Class A1-A5) (1831m2), medical centre (Class D1), 51 apartments and 283 space car park.	250
08/00498/FUL	1 Neptune Quay Ipswich Suffolk	The demolition of the former Snooker Club building adjacent the Salthouse Harbour Hotel and its replacement with a new six storey extension to the hotel to provide 27 no. additional bedrooms, a new reception area, lobby stores and office together with internal works of alteration to the existing hotel to extend the restaurant and bar area and external works to the driveway.	38
09/00554/FUL	100 Rope Walk Ipswich Suffolk	Construction of sports hall, 11 floodlit all-weather football courts, (10 x 5 - a - side, and 1 x 7 - a - side) car parking, landscaping and associated works.	15
10/00565/FUL	Haven Power The Havens Ipswich Suffolk	Extension of office building, additional access, new car parking area and associated works.	150

11/00173/FUL	9 Russell Road Ipswich Suffolk	Change of use from A1 (retail) to A2 financial services plus installation of air conditioning condenser units.	4
08/00311/FUL	5 Bailey Close Ipswich Suffolk	Erection of two single-storey business units with cycle shelter (for business/light industrial use, B1/B2).	10
07/00729/FUL	6 The Drift Nacton Road Ipswich Suffolk	Conversion and change of use from printing premises (Class B2) to ten small business units (Class B1, B2 and B8).	131
	Land Opposite To 21 The Havens Ipswich Suffolk	Erection of Building for repair/servicing of heavy goods vehicles and MOT Testing, distribution and sale of vehicle parts with offices and a terrace of 2 storey business and workshop units.	88
06/00924/FUL	Land To The North, West Road Ipswich	Erection of fourteen two-storey and fifteen three storey business units (B1) car parking, landscaping and associated works.	816
13/00229/FUL	19 Holywells Road Ipswich Suffolk	Change of use to office with associated workshop/store plus parking and external works, and demolition of existing office building (site in floodzone 2 and 3).	8
11/00448/FUL	5 Cavendish Street Ipswich Suffolk	Erection of commercial building for B1, B2 and B8 uses with trade counter (15%).	13
IP/11/00763/OUTFL	Futura Park	Phase 1 - Food Retail (Waitrose)	318
IP/11/00763/OUTFL	Futura Park	Phase 1 - Non Food Retail (John Lewis)	60
IP/11/00763/OUTFL	Futura Park	Phase 2 - Non Food Retail	60
CS13(A)	Futura Park	B2	301
CS13(B)	Futura Park	B8 Large scale as close to A14	175
CS14	Futura Park	Approved car showrooms	131
06/00592	493 – 499 Wherstead Road	Erection of 70 square metres extension to existing factory	0
IP004	Bus Depot, Sir Alf Ramsey Way	Offices B1a use	205
IP011b	Smart Street/Foundation Street	Employment B1 uses	53
IP015	West End Road Surface Car Park	Offices B1a use	78
IP035	Key Street/Star Lane/Burtons Site	Employment B1 uses, hotel and leisure, small scale retail. '259 B1+ '500 leisure + 200 small retail	58
IP040	Civic Centre area, Civic Drive	Retail A1	631
IP043	Commercial Bldgs & Jewish Burial Ground, Star Lane	Employment B1 uses	54
IP051	Old Cattle Market site, Portman Road (South)	Offices B1a and hotel or leisure	1590
IP052	Land between Lower Orwell Street and Star Lane	Employment B1 uses	31
IP054	Land between Old Cattle Market and Star Lane	Office/Leisure	154
IP058	Raeburn Road South/Sandy Hill Lane	Industrial (B class or similar Sui Generis uses excluding office)	313
IP067	Former British Energy Site, Cliff Quay	Industrial (B class or similar Sui Generis uses excluding office)	233
IP094	Rear of Grafton House, Russell Road	Offices B1a	198
IP099	Part former Volvo site, Raeburn Road South	Industrial (B class or similar Sui Generis uses excluding office)	124
IP140	Land north of Whitton	Business B1 including offices B1a. Other B class	619

	Lane	or similar Sui Generis uses	
IP146	Ransomes Europark (east)/Land around Makro	Employment (B class or similar Sui Generis uses)	417
IP147	Land between railway junction and Hadleigh Road	Employment (B class or similar Sui Generis uses excluding office)	253
IP150c	Ravenswood	B1 uses	1000
IP152	Airport Farm Kennels, north of A14	B1, B2, B8 excluding B1a offices. Other similar Sui Generis uses	727
IP047	Land at Commercial Road	B1b	366
IP049	No 8 Shed Orwell Quay	Offices	201
IP005	Former Tooks Bakery, Old Norwich Road	Heath Centre element of housing allocation	25
IP258	Land at UCS	New primary school	19
IP260	The former Odeon Cinema	Leisure uses	34
IP037	Island site	B1 and small scale retail or food and drink	606
IP132	Former St Peters Warehouse	B1a	14
15/01041/FUL	Land between Cliff Quay and Landseer Road	4,220m² A1 shops, 189m² A3 restaurant, 2,220m² B1 office, 127 room hotel, 1,449m² D2 gym, 1,347m² A4 nightclub.	326
IP136		20% of site small retail or employment	17
	Ipswich Garden Suburb District Centre	Convenience Shopping	118
	Ipswich Garden Suburb District Centre	Comparison Shopping	64
	Ipswich Garden Suburb District Centre	Services Uses (including non-retail Use Class A1, plus A2 to A5 uses) (50% A2 assumed)	41
	Ipswich Garden Suburb District Centre	Services Uses (including non-retail Use Class A1, plus A2 to A5 uses) (50% A3 assumed)	37
	Ipswich Garden Suburb Health Centre, Police Station and Library		30
	Ipswich Garden Suburb Secondary School		95
	Ipswich Garden Suburb Primary School 1		33
	Ipswich Garden Suburb Primary School 2 + 3		66
	Ipswich Garden Suburb Local Centre 1	Convenience Shopping	15
	Ipswich Garden Suburb Local Centre 1	Comparison Shopping	16
	Ipswich Garden Suburb Local Centre 1	Services Uses (including non-retail Use Class A1, plus A2 to A5 uses) (50% A2 assumed)	8
	Ipswich Garden Suburb Local Centre 1	Services Uses (including non-retail Use Class A1, plus A2 to A5 uses) (50% A3 assumed)	7
	Ipswich Garden Suburb Local Centre 2	Convenience Shopping	15
	Ipswich Garden Suburb Local Centre 2	Comparison Shopping	16
	Ipswich Garden Suburb Local Centre 2	Services Uses (including non-retail Use Class A1, plus A2 to A5 uses) (50% A2 assumed)	8
	Ipswich Garden Suburb Local Centre 2	Services Uses (including non-retail Use Class A1, plus A2 to A5 uses) (50% A3 assumed)	7
13/01073/P3JPA	Western House, Dunlop Road	Prior notification of change of use from B1 (office) to C3 (residential) with conversion of 1st to 5th floors into 35 one bed and 15 two bed flats.	-133
13/01108/P3JPA	15 St Helens Street	Notification of change of use from offices to 5 flats.	-5
13/01110/P3JPA	Eastgate House, 45 Carr	Notification of a change of use from offices to flats	-97

	Street	(25 units).	
14/00418/P3JPA	2 Lower Brook Street	Notification for change of use from office to residential.	-12
14/00501/P3JPA	231 – 233 Foxhall Road	Application for prior notification for change of use from B1(a) (Office) to C3 (Residential) - two x2-bed and one x1-bed.	-18
14/00526/P3JPA	43 Norwich Road	Notification change of use from retail of ground floor and basement to 2 one bed flats.	-2
14/00587/P3JPA	16 – 18 Princes Street	Notification of change of use from offices to residential flats (33 studio flats with 8 parking spaces).	-185
14/00743/P3JPA	3 Coachmans Court, Old Cattle Market	Application for prior notification for change of use from B1 (office) to 3 flats.	-19
14/00810/P3JPA	St Edmund House, Rope Walk	Application for prior notification for change of use from B1 (Offices) to C3 (74 Flats).	-703
14/00904/P3JPA	2 Lower Brook Mews	Application for prior notification for change of use from B1 (office) to C3 (residential) (one x 2-bed and one x 1-bed flats)	-12
14/00949/P3JPA	30 St Matthews Street	Application for prior notification for change of use from B1(office) to C3 (dwellinghouse) (two x1-bed flats).	-11
15/00011/P3JPA	Electric House, Lloyds Avenue	Application for prior notification for change of use from B1(a) (Office) to C3 (residential) (Four x1-bed flats and nine x2-bed flats).	-25
06/00014/FUL	Wolsey Court, 26-28 Silent Street, IP1 1TF	Change of use from offices to 4 self contained flats on upper floors and commercial use (within Use Classes A1, A2 or B1) on ground floor, works include internal and external alterations and associated works.	-18
14/00097/VC	16 Northgate Street, IP1 3DB	Application for variation of condition 1 of planning permission IP/13/00851/FUL for change of use from offices to dwelling house involving reconfiguration of rear garden, erection of new garden room and installation of solar panels on main roof (revised proposal and description).	-20
13/00360/FUL	3 Observation Court, 84 Princes Street , IP1 1RY	Change of use of first floor B1 (office) to C3 (two bedroom flat) (site within floodzone 2 and 3).	-6
13/00891/FUL	29 Elm Street, IP1 2AB	Internal alterations and conversion of office accommodation to create dwelling.	-16
14/00221/FUL	20A and 22 Fore Street	Change of use of first and second floor from B1 (offices) to 2 self-contained flats (C3) and external alterations.	-6
14/00438/FUL	65 St Matthews Street	Change of use from offices (Use Class A2) to offices (Use Class B1 or A2) with two flats above. External alterations involving new door at ground floor level fronting St Matthews Street.	1
14/00507/FUL	3A North Hill Road	Conversion and extension of office building to create 4 self-contained 1 bedroom apartments and associated works	-22
14/00678/FUL	County Hall, St Helens Street	Change of use of part (north west corner) of former county council offices to registry office (D1).	-48
14/00912/FUL	Christies Warehouse, Wherry Quay	Change of use from offices (B1) To a bar/restaurant (A3/A4)	-17
15/00120/FUL	15-17 Princes Street	Change of use from office (B1) to assessment centre (D1) (for a period of 10 years).	-8
14/00245/FUL	7 Edison Close	Two storey extension (355sqm) to B2 premises with storage system to existing elevation, carport and cycle storage.	8
14/00325/FUL	53-65 White House Road	Change of use from Class B2 (General Industrial) to Class B8 (Storage and Distribution).	-71
14/00656/FUL	Former Alstons Ltd, Nacton Road	Change of use from General Industry and warehousing to 100% warehousing and distribution (B8).	-130
14/00297/FUL	81 - 85 Dales Road	Erection of two commercial units for B1/B2/B8	9

		(Business/Industrial/Storage) use (resubmission of IP/13/01048/FUL).	
14/00368/FUL	267 Dales Road	Erection of a single storey attached extension to form self-contained B1 office (in association with the occupiers business).	1
14/00698/FUL	Ground floor North, 6 South Street	Change of use from A1 (retail) to B1	8
14/00940/FUL	East Suffolk Family Health, St Clements Hospital, Foxhall Road	Change of use from Class D1 to office and workshops and training rooms with associated external alteration to building and external areas including car parks and installation of fencing.	70
	Ipswich Fringe Site (Wolsey Grange)	Core Strategy - 6 hectares 2016-2021 - Estimated split between B1b and B1a class land uses	1989
B/7/01011, B/11/00118	Land East of London Road And West of, Scrivener Drive, Pinewood	Erection of new headquarters building with associated car parking and external works for Fred.Olsen Cruise Lines Ltd (extension of time limit to condition attached to P. P. B/07/01011/FUL	369
B/1101514	Veterinary Centre	Approved and under construction.	30
	London Road/Scrivener Drive (remaining area)		72
	Former Sugar Beet Factory Site, Sproughton	Core Strategy 35.5 hectares	2131
B/15/00124	Land west of Suffolk One, Scrivener Drive, Pinewood	Erection of retail foodstore, and associated car parking and landscaping, as amplified by details received 10th April 2015. Application received, decision pending.	107
B/08/00873	Suffolk One, Scrivener Drive, Pinewood, IPSWICH	Application under Regulation 3 of the Town and Country Planning General Regulations 1992 - Erection of new sixth form centre (20,750 sqm), synthetic turf sports pitch and associated floodlighting. Car park, bus drop-off area, landscaping and footpath diversion.	231
	Wherstead Park allocation		1056
	Orion Business Park, Gt. Blakenham (exact location unknown)		130
3054/12	Energy from Waste, Lodge Lane, Great Blakenham		43
C11/1987	Land rear of Sheepdrift Cottage, Waldringfield Rd	Erection of B1 business units	206
C08/0486	Old Station Works, Westerfield Rd	Erection of industrial/commercial units (B1)	203
C08/0626	Land rear of Sheepdrift Cottage, Waldringfield Rd	Erection of B1 business units	66
C08/0486	Old Station Works, Westerfield Rd	Erection of industrial/commercial units (B1)	203
C09/1964	Anson Rd, Martlesham Heath Business Park	Proposed non food retail unit	20
C10/3040	Land off Anson Rd, Martlesham Heath Business Park	Erection of non food retailing units	444
C13/1214	Land south of Martinside/Gloster Rd, Martlesham Heath Business Park	Erection of non food retailing units	43
DC/13/3408	Sinks Gravel Pit, Main Rd	Erection of new headquarters for vehicle and plant hire operator	313
C/09/0555	Adastral Park		2000
	Ransomes Europark extension	Allocation	5280

Appendix B

TRIP GENERATION

Zone	Site	Dwellings	Car – Residential Trips							
			Commuting		Other		Education		Business	
			Production	Attraction	Production	Attraction	Production	Attraction	Production	Attraction
781	IP200	116	66	0	137	29	23	0	8	0
494	IP200	116	66	0	137	29	23	0	8	0
495	IP/04/00105/FUL	73	42	0	86	18	14	0	5	0
23	IP/04/00313/FUL	335	192	0	396	83	66	0	22	0
96	IP/04/00804/FUL	48	28	0	57	12	10	0	3	0
96	IP/06/01180/REM	21	12	0	25	5	4	0	1	0
96	IP/09/00264/FUL	9	5	0	11	2	2	0	1	0
108	IP/04/01127/REM	37	21	0	44	9	7	0	2	0
916	IP/04/01290/FUL	102	59	0	121	25	20	0	7	0
115	IP/05/00290/FUL	2	1	0	2	0	0	0	0	0
115	IP/07/00679/FUL	26	15	0	31	6	5	0	2	0
23	IP/05/00296/FUL	267	153	0	316	66	53	0	18	0
55	IP/05/00590/FUL	263	151	0	311	65	52	0	18	0
19	IP/05/00641/FUL	78	45	0	92	19	15	0	5	0
59	IP/06/00087/FUL	24	14	0	28	6	5	0	2	0
106	IP/07/00064/FUL	24	14	0	28	6	5	0	2	0
52	IP/07/00123/FUL	72	41	0	85	18	14	0	5	0
52	IP/09/00612/FUL	203	117	0	240	51	40	0	14	0
52	IP/09/00579/FUL	29	17	0	34	7	6	0	2	0
69	IP/07/00190/FUL	38	22	0	45	9	8	0	3	0
65	IP/07/00716/FUL	94	54	0	111	23	19	0	6	0
185	IP/07/00715/FUL	35	20	0	41	9	7	0	2	0
185	IP/08/00246/REM	95	55	0	112	24	19	0	6	0
65	IP/09/00197/FUL	30	17	0	35	7	6	0	2	0
52	IP/09/00787/FUL	42	24	0	50	10	8	0	3	0
3	IP/10/00108/FUL	32	18	0	38	8	6	0	2	0
490	IP/10/00867/FUL	386	222	0	456	96	77	0	26	0
145	IP/11/00980/REM	48	28	0	57	12	10	0	3	0

Zone	Site Ref	Dwellings	Car – RESIDENTIAL TRIPS							
			Commuting		Other		Education		Business	
			Production	Attraction	Production	Attraction	Production	Attraction	Production	Attraction
35	IP/10/00935/FUL	59	34	0	70	15	12	0	4	0
916	IP/08/00518/FUL	151	87	0	178	38	30	0	10	0
164	13/00368	108	62	0	128	27	21	0	7	0
62	13/01073	50	29	0	59	12	10	0	3	0
117	12/00429	59	34	0	70	15	12	0	4	0
185	14/00435	94	54	0	111	23	19	0	6	0
73	12/00700	0	0	0	0	0	0	0	0	0
52	14/00920	39	22	0	46	10	8	0	3	0
96	13/00943	94	54	0	111	23	19	0	6	0
23	02/01241 / IP205	125	72	0	148	31	25	0	8	0
23	IP132	73	42	0	86	18	14	0	5	0
31	14/00310	74	43	0	87	18	15	0	5	0
5	13/01110	25	14	0	30	6	5	0	2	0
107	14/00376	22	13	0	26	5	4	0	1	0
6	14/00587	33	19	0	39	8	7	0	2	0
72	IGS Allocation	1000	575	0	1182	249	198	0	67	0
72	IGS Allocation	1100	632	0	1300	274	218	0	74	0
91	IGS Allocation	1400	804	0	1655	348	278	0	94	0
35	IP004	48	28	0	57	12	10	0	3	0
155	IP005 & IP032	200	115	0	236	50	40	0	13	0
55	IP006	28	16	0	33	7	6	0	2	0
111	IP010a & IP010b	141	81	0	167	35	28	0	9	0
16	IP011b	50	29	0	59	12	10	0	3	0
21	IP012	29	17	0	34	7	6	0	2	0
106	IP029	71	41	0	84	18	14	0	5	0
96	IP033	46	26	0	54	11	9	0	3	0
37	IP037	271	156	0	320	67	54	0	18	0
49	IP039a	43	25	0	51	11	9	0	3	0

Zone	Site Ref	Dwellings	Car – RESIDENTIAL TRIPS							
			Commuting		Other		Education		Business	
			Production	Attraction	Production	Attraction	Production	Attraction	Production	Attraction
26	IP043	50	29	0	59	12	10	0	3	0
5	IP048	72	41	0	85	18	14	0	5	0
16	IP052	29	17	0	34	7	6	0	2	0
15	IP054	28	16	0	33	7	6	0	2	0
76	IP059a	105	60	0	124	26	21	0	7	0
74	IP061	30	17	0	35	7	6	0	2	0
78	IP080	27	16	0	32	7	5	0	2	0
581	IP098	51	29	0	60	13	10	0	3	0
129	IP116	227	130	0	268	56	45	0	15	0
49	IP133	33	19	0	39	8	7	0	2	0
23	IP136	48	28	0	57	12	10	0	3	0
580	IP142	26	15	0	31	6	5	0	2	0
581	IP226	540	310	0	638	134	107	0	36	0
917	IP015	22	13	0	26	5	4	0	1	0
39	IP031	20	11	0	24	5	4	0	1	0
800	IP047	103	59	0	122	26	20	0	7	0
26	IP089	23	13	0	27	6	5	0	2	0
35	IP096	20	11	0	24	5	4	0	1	0
87	15/01041/FUL	222	128	0	262	55	44	0	15	0
172	2700/12	176	101	0	208	44	35	0	12	0
219	3310/14	426	245	0	504	106	85	0	29	0
175	2986/15	130	75	0	154	32	26	0	9	0
179	14/01375, 14/01437	220	126	0	260	55	44	0	15	0
931	B/15/00993	475	273	0	561	118	94	0	32	0
162	B/11/00745	30	17	0	35	7	6	0	2	0
238	C/10/1906	180	103	0	213	45	36	0	12	0
924	Adastral Park	1000	575	0	1182	249	198	0	67	0
926	Adastral Park	1000	575	0	1182	249	198	0	67	0

Zone	Site Ref	Dwellings	Car – RESIDENTIAL TRIPS							
			Commuting		Other		Education		Business	
			Production	Attraction	Production	Attraction	Production	Attraction	Production	Attraction
200	C/12/1930	300	172	0	355	75	60	0	20	0
223	C13/0617	22	13	0	26	5	4	0	1	0
188	C12/1381	23	13	0	27	6	5	0	2	0
180	C12/0237	63	36	0	74	16	12	0	4	0
180	C06/0703	15	9	0	18	4	3	0	1	0
180	C06/1709	33	19	0	39	8	7	0	2	0
180	C03/0620	39	22	0	46	10	8	0	3	0
180	Grange Farm, Kesgrave	204	117	0	241	51	40	0	14	0
123	SSP17	20	11	0	24	5	4	0	1	0
304	SSP18	20	11	0	24	5	4	0	1	0

Zone	Site Ref	Dwellings	Bus – RESIDENTIAL TRIPS							
			Commuting		Other		Education		Business	
			Production	Attraction	Production	Attraction	Production	Attraction	Production	Attraction
781	IP200	116	5	0	9	2	6	0	0	0
494	IP200	116	5	0	9	2	6	0	0	0
495	IP/04/00105/FUL	73	3	0	6	1	4	0	0	0
23	IP/04/00313/FUL	335	13	0	26	5	17	0	0	0
96	IP/04/00804/FUL	48	2	0	4	1	2	0	0	0
96	IP/06/01180/REM	21	1	0	2	0	1	0	0	0
96	IP/09/00264/FUL	9	0	0	1	0	0	0	0	0
108	IP/04/01127/REM	37	1	0	3	1	2	0	0	0
916	IP/04/01290/FUL	102	4	0	8	2	5	0	0	0
115	IP/05/00290/FUL	2	0	0	0	0	0	0	0	0
115	IP/07/00679/FUL	26	1	0	2	0	1	0	0	0
23	IP/05/00296/FUL	267	10	0	21	4	13	0	0	0
55	IP/05/00590/FUL	263	10	0	20	4	13	0	0	0
19	IP/05/00641/FUL	78	3	0	6	1	4	0	0	0
59	IP/06/00087/FUL	24	1	0	2	0	1	0	0	0
106	IP/07/00064/FUL	24	1	0	2	0	1	0	0	0
52	IP/07/00123/FUL	72	3	0	6	1	4	0	0	0
52	IP/09/00612/FUL	203	8	0	16	3	10	0	0	0
52	IP/09/00579/FUL	29	1	0	2	0	1	0	0	0
69	IP/07/00190/FUL	38	1	0	3	1	2	0	0	0
65	IP/07/00716/FUL	94	4	0	7	1	5	0	0	0
185	IP/07/00715/FUL	35	1	0	3	1	2	0	0	0
185	IP/08/00246/REM	95	4	0	7	1	5	0	0	0
65	IP/09/00197/FUL	30	1	0	2	0	2	0	0	0
52	IP/09/00787/FUL	42	2	0	3	1	2	0	0	0
3	IP/10/00108/FUL	32	1	0	2	0	2	0	0	0
490	IP/10/00867/FUL	386	15	0	30	6	19	0	1	0
145	IP/11/00980/REM	48	2	0	4	1	2	0	0	0

Zone	Site Ref	Dwellings	Bus – RESIDENTIAL TRIPS							
			Commuting		Other		Education		Business	
			Production	Attraction	Production	Attraction	Production	Attraction	Production	Attraction
35	IP/10/00935/FUL	59	2	0	5	1	3	0	0	0
916	IP/08/00518/FUL	151	6	0	12	2	8	0	0	0
164	13/00368	108	4	0	8	2	5	0	0	0
62	13/01073	50	2	0	4	1	3	0	0	0
117	12/00429	59	2	0	5	1	3	0	0	0
185	14/00435	94	4	0	7	1	5	0	0	0
73	12/00700	0	0	0	0	0	0	0	0	0
52	14/00920	39	2	0	3	1	2	0	0	0
96	13/00943	94	4	0	7	1	5	0	0	0
23	02/01241 / IP205	125	5	0	10	2	6	0	0	0
23	IP132	73	3	0	6	1	4	0	0	0
31	14/00310	74	3	0	6	1	4	0	0	0
5	13/01110	25	1	0	2	0	1	0	0	0
107	14/00376	22	1	0	2	0	1	0	0	0
6	14/00587	33	1	0	3	0	2	0	0	0
72	IGS Allocation	1000	39	0	78	15	50	0	1	0
72	IGS Allocation	1100	43	0	85	16	56	0	1	0
91	IGS Allocation	1400	55	0	109	21	71	0	2	0
35	IP004	48	2	0	4	1	2	0	0	0
155	IP005 & IP032	200	8	0	16	3	10	0	0	0
55	IP006	28	1	0	2	0	1	0	0	0
111	IP010a & IP010b	141	6	0	11	2	7	0	0	0
16	IP011b	50	2	0	4	1	3	0	0	0
21	IP012	29	1	0	2	0	1	0	0	0
106	IP029	71	3	0	6	1	4	0	0	0
96	IP033	46	2	0	4	1	2	0	0	0
37	IP037	271	11	0	21	4	14	0	0	0
49	IP039a	43	2	0	3	1	2	0	0	0

Zone	Site Ref	Dwellings	Bus – RESIDENTIAL TRIPS							
			Commuting		Other		Education		Business	
			Production	Attraction	Production	Attraction	Production	Attraction	Production	Attraction
26	IP043	50	2	0	4	1	3	0	0	0
5	IP048	72	3	0	6	1	4	0	0	0
16	IP052	29	1	0	2	0	1	0	0	0
15	IP054	28	1	0	2	0	1	0	0	0
76	IP059a	105	4	0	8	2	5	0	0	0
74	IP061	30	1	0	2	0	2	0	0	0
78	IP080	27	1	0	2	0	1	0	0	0
581	IP098	51	2	0	4	1	3	0	0	0
129	IP116	227	9	0	18	3	11	0	0	0
49	IP133	33	1	0	3	0	2	0	0	0
23	IP136	48	2	0	4	1	2	0	0	0
580	IP142	26	1	0	2	0	1	0	0	0
581	IP226	540	21	0	42	8	27	0	1	0
917	IP015	22	1	0	2	0	1	0	0	0
39	IP031	20	1	0	2	0	1	0	0	0
800	IP047	103	4	0	8	2	5	0	0	0
26	IP089	23	1	0	2	0	1	0	0	0
35	IP096	20	1	0	2	0	1	0	0	0
87	15/01041/FUL	222	9	0	17	3	11	0	0	0
172	2700/12	176	7	0	14	3	9	0	0	0
219	3310/14	426	17	0	33	6	22	0	1	0
175	2986/15	130	5	0	10	2	7	0	0	0
179	14/01375, 14/01437	220	9	0	17	3	11	0	0	0
931	B/15/00993	475	19	0	37	7	24	0	1	0
162	B/11/00745	30	1	0	2	0	2	0	0	0
238	C/10/1906	180	7	0	14	3	9	0	0	0
924	Adastral Park	1000	39	0	78	15	50	0	1	0
926	Adastral Park	1000	39	0	78	15	50	0	1	0

Zone	Site Ref	Dwellings	Bus – RESIDENTIAL TRIPS							
			Commuting		Other		Education		Business	
			Production	Attraction	Production	Attraction	Production	Attraction	Production	Attraction
200	C/12/1930	300	12	0	23	4	15	0	0	0
223	C13/0617	22	1	0	2	0	1	0	0	0
188	C12/1381	23	1	0	2	0	1	0	0	0
180	C12/0237	63	2	0	5	1	3	0	0	0
180	C06/0703	15	1	0	1	0	1	0	0	0
180	C06/1709	33	1	0	3	0	2	0	0	0
180	C03/0620	39	2	0	3	1	2	0	0	0
180	Grange Farm, Kesgrave	204	8	0	16	3	10	0	0	0
123	SSP17	20	1	0	2	0	1	0	0	0
304	SSP18	20	1	0	2	0	1	0	0	0

Zone	Site Ref	Dwellings	Active – RESIDENTIAL TRIPS							
			Commuting		Other		Education		Business	
			Production	Attraction	Production	Attraction	Production	Attraction	Production	Attraction
781	IP200	116	12	0	66	14	21	0	1	0
494	IP200	116	12	0	66	14	21	0	1	0
495	IP/04/00105/FUL	73	8	0	42	9	14	0	0	0
23	IP/04/00313/FUL	335	36	0	192	39	62	0	2	0
96	IP/04/00804/FUL	48	5	0	27	6	9	0	0	0
96	IP/06/01180/REM	21	2	0	12	2	4	0	0	0
96	IP/09/00264/FUL	9	1	0	5	1	2	0	0	0
108	IP/04/01127/REM	37	4	0	21	4	7	0	0	0
916	IP/04/01290/FUL	102	11	0	58	12	19	0	1	0
115	IP/05/00290/FUL	2	0	0	1	0	0	0	0	0
115	IP/07/00679/FUL	26	3	0	15	3	5	0	0	0
23	IP/05/00296/FUL	267	29	0	153	31	50	0	2	0
55	IP/05/00590/FUL	263	28	0	151	31	49	0	2	0
19	IP/05/00641/FUL	78	8	0	45	9	14	0	0	0
59	IP/06/00087/FUL	24	3	0	14	3	4	0	0	0
106	IP/07/00064/FUL	24	3	0	14	3	4	0	0	0
52	IP/07/00123/FUL	72	8	0	41	8	13	0	0	0
52	IP/09/00612/FUL	203	22	0	116	24	38	0	1	0
52	IP/09/00579/FUL	29	3	0	17	3	5	0	0	0
69	IP/07/00190/FUL	38	4	0	22	4	7	0	0	0
65	IP/07/00716/FUL	94	10	0	54	11	17	0	1	0
185	IP/07/00715/FUL	35	4	0	20	4	6	0	0	0
185	IP/08/00246/REM	95	10	0	54	11	18	0	1	0
65	IP/09/00197/FUL	30	3	0	17	4	6	0	0	0
52	IP/09/00787/FUL	42	5	0	24	5	8	0	0	0
3	IP/10/00108/FUL	32	3	0	18	4	6	0	0	0
490	IP/10/00867/FUL	386	42	0	221	45	72	0	2	0
145	IP/11/00980/REM	48	5	0	27	6	9	0	0	0

Zone	Site Ref	Dwellings	Active – RESIDENTIAL TRIPS							
			Commuting		Other		Education		Business	
			Production	Attraction	Production	Attraction	Production	Attraction	Production	Attraction
35	IP/10/00935/FUL	59	6	0	34	7	11	0	0	0
916	IP/08/00518/FUL	151	16	0	86	18	28	0	1	0
164	13/00368	108	12	0	62	13	20	0	1	0
62	13/01073	50	5	0	29	6	9	0	0	0
117	12/00429	59	6	0	34	7	11	0	0	0
185	14/00435	94	10	0	54	11	17	0	1	0
73	12/00700	0	0	0	0	0	0	0	0	0
52	14/00920	39	4	0	22	5	7	0	0	0
96	13/00943	94	10	0	54	11	17	0	1	0
23	02/01241 / IP205	125	13	0	72	15	23	0	1	0
23	IP132	73	8	0	42	9	14	0	0	0
31	14/00310	74	8	0	42	9	14	0	0	0
5	13/01110	25	3	0	14	3	5	0	0	0
107	14/00376	22	2	0	13	3	4	0	0	0
6	14/00587	33	4	0	19	4	6	0	0	0
72	IGS Allocation	1000	108	0	573	118	185	0	6	0
72	IGS Allocation	1100	119	0	630	130	204	0	6	0
91	IGS Allocation	1400	151	0	802	165	260	0	8	0
35	IP004	48	5	0	27	6	9	0	0	0
155	IP005 & IP032	200	22	0	115	24	37	0	1	0
55	IP006	28	3	0	16	3	5	0	0	0
111	IP010a & IP010b	141	15	0	81	17	26	0	1	0
16	IP011b	50	5	0	29	6	9	0	0	0
21	IP012	29	3	0	17	3	5	0	0	0
106	IP029	71	8	0	41	8	13	0	0	0
96	IP033	46	5	0	26	5	9	0	0	0
37	IP037	271	29	0	155	32	50	0	2	0
49	IP039a	43	5	0	25	5	8	0	0	0

Zone	Site Ref	Dwellings	Active – RESIDENTIAL TRIPS							
			Commuting		Other		Education		Business	
			Production	Attraction	Production	Attraction	Production	Attraction	Production	Attraction
26	IP043	50	5	0	29	6	9	0	0	0
5	IP048	72	8	0	41	8	13	0	0	0
16	IP052	29	3	0	17	3	5	0	0	0
15	IP054	28	3	0	16	3	5	0	0	0
76	IP059a	105	11	0	60	12	19	0	1	0
74	IP061	30	3	0	17	4	6	0	0	0
78	IP080	27	3	0	15	3	5	0	0	0
581	IP098	51	5	0	29	6	9	0	0	0
129	IP116	227	24	0	130	27	42	0	1	0
49	IP133	33	4	0	19	4	6	0	0	0
23	IP136	48	5	0	27	6	9	0	0	0
580	IP142	26	3	0	15	3	5	0	0	0
581	IP226	540	58	0	309	64	100	0	3	0
917	IP015	22	2	0	13	3	4	0	0	0
39	IP031	20	2	0	11	2	4	0	0	0
800	IP047	103	11	0	59	12	19	0	1	0
26	IP089	23	2	0	13	3	4	0	0	0
35	IP096	20	2	0	11	2	4	0	0	0
87	15/01041/FUL	222	24	0	127	26	41	0	1	0
172	2700/12	176	19	0	101	21	33	0	1	0
219	3310/14	426	46	0	244	50	79	0	2	0
175	2986/15	130	14	0	74	15	24	0	1	0
179	14/01375, 14/01437	220	24	0	126	26	41	0	1	0
931	B/15/00993	475	51	0	272	56	88	0	3	0
162	B/11/00745	30	3	0	17	4	6	0	0	0
238	C/10/1906	180	19	0	103	21	33	0	1	0
924	Adastral Park	1000	108	0	573	118	185	0	6	0
926	Adastral Park	1000	108	0	573	118	185	0	6	0

Zone	Site Ref	Dwellings	Active – RESIDENTIAL TRIPS							
			Commuting		Other		Education		Business	
			Production	Attraction	Production	Attraction	Production	Attraction	Production	Attraction
200	C/12/1930	300	32	0	172	35	56	0	2	0
223	C13/0617	22	2	0	13	3	4	0	0	0
188	C12/1381	23	2	0	13	3	4	0	0	0
180	C12/0237	63	7	0	36	7	12	0	0	0
180	C06/0703	15	2	0	9	2	3	0	0	0
180	C06/1709	33	4	0	19	4	6	0	0	0
180	C03/0620	39	4	0	22	5	7	0	0	0
180	Grange Farm, Kesgrave	204	22	0	117	24	38	0	1	0
123	SSP17	20	2	0	11	2	4	0	0	0
304	SSP18	20	2	0	11	2	4	0	0	0

Zone	Site Ref	Jobs	Car – Employment Trips							
			Commuting		Other		Education		Business	
			Production	Attraction	Production	Attraction	Production	Attraction	Production	Attraction
197	06/00615/FUL	54	6	34	13	62	1	12	5	8
64	07/00641/FUL	40	4	25	10	46	1	9	4	6
80	08/00025/FUL	0	0	0	0	0	0	0	0	0
59	06/00838/FUL	152	16	96	37	174	3	33	14	22
197	07/00486/REM	160	17	101	38	183	4	34	15	23
14	07/00738/FUL	70	7	44	17	80	2	15	6	10
55	07/01047/FUL	30	3	19	7	34	1	6	3	4
31	07/00488/FUL	400	43	253	96	458	9	86	36	58
101	05/01010/FUL	250	27	158	60	287	6	54	23	36
30	08/00498/FUL	38	4	24	9	44	1	8	3	6
31	09/00554/FUL	15	2	10	4	18	0	3	1	2
197	10/00565/FUL	150	16	95	36	172	3	32	14	22
28	11/00173/FUL	4	0	3	1	5	0	1	0	1
64	08/00311/FUL	10	1	6	2	12	0	2	1	1
173	07/00729/FUL	131	14	83	31	150	3	28	12	19
197	Land Opposite To 21 The Havens	47	5	30	11	54	1	10	4	7
197	Land Opposite To 21 The Havens	35	4	22	8	40	1	8	3	5
197	Land Opposite To 21 The Havens	6	1	4	1	7	0	1	1	1
197	Land Opposite To 21 The Havens	0	0	0	0	0	0	0	0	0
190	06/00924/FUL	816	87	515	196	935	18	176	74	119
790	13/00229/FUL	8	1	5	2	9	0	2	1	1
54	11/00448/FUL	13	1	8	3	15	0	3	1	2
930	IP/11/00763/OUTFL	318	34	201	76	364	7	68	29	46
930	IP/11/00763/OUTFL	60	6	38	14	69	1	13	5	9
929	IP/11/00763/OUTFL	60	6	38	14	69	1	13	5	9
928	CS13(A)	301	32	190	72	345	7	65	27	44
927	CS13(B)	175	19	111	42	201	4	38	16	26
925	CS14	131	14	83	31	150	3	28	12	19

Zone	Site Ref	Jobs	Car – EMPLOYMENT TRIPS							
			Commuting		Other		Education		Business	
			Production	Attraction	Production	Attraction	Production	Attraction	Production	Attraction
22	IP004	205	22	130	49	235	5	44	19	30
16	IP011b	53	6	33	13	61	1	11	5	8
917	IP015	78	8	49	19	89	2	17	7	11
23	IP035(A)	21	2	13	5	24	0	5	2	3
23	IP035(B)	37	4	23	9	42	1	8	3	5
3	IP040	631	67	399	152	723	14	136	57	92
26	IP043	54	6	34	13	62	1	12	5	8
914	IP051(A)	674	72	426	162	773	15	145	61	98
914	IP051(B)	884	95	558	212	1013	20	191	80	129
914	IP051(C)	32	3	20	8	37	1	7	3	5
16	IP052	31	3	20	7	36	1	7	3	5
15	IP054	154	16	97	37	177	3	33	14	22
132	IP058	313	33	198	75	359	7	67	28	46
132	IP067	233	25	147	56	267	5	50	21	34
28	IP094	198	21	125	48	227	4	43	18	29
132	IP099	124	13	78	30	142	3	27	11	18
902	IP140(A)	347	37	219	83	398	8	75	31	51
902	IP140(B)	108	12	68	26	124	2	23	10	16
902	IP140(C)	164	18	104	39	188	4	35	15	24
197	IP146(A)	202	22	128	49	232	5	44	18	29
197	IP146(B)	215	23	136	52	246	5	46	19	31
76	IP147	253	27	160	61	290	6	55	23	37
185	IP150C(A)	704	75	445	169	807	16	152	64	103
185	IP150C(B)	296	32	187	71	339	7	64	27	43
185	IP152(A)	553	59	349	133	634	13	119	50	81
185	IP152(B)	174	19	110	42	199	4	38	16	25
800	IP047	366	39	231	88	419	8	79	33	53
581	IP049	201	21	127	48	230	5	43	18	29

Zone	Site Ref	Jobs	Car – EMPLOYMENT TRIPS							
			Commuting		Other		Education		Business	
			Production	Attraction	Production	Attraction	Production	Attraction	Production	Attraction
155	IP005	25	3	16	6	29	1	5	2	4
33	IP258	19	2	12	5	22	0	4	2	3
18	IP260	34	4	21	8	39	1	7	3	5
37	IP037(A)	367	39	232	88	421	8	79	33	54
37	IP037(B)	90	10	57	22	103	2	19	8	13
37	IP037(C)	116	12	73	28	133	3	25	11	17
37	IP037(D)	33	4	21	8	38	1	7	3	5
23	IP132	14	1	9	3	16	0	3	1	2
87	15/01041/FUL	22	2	14	5	25	0	5	2	3
87	15/01041/FUL	44	5	28	11	51	1	10	4	6
87	15/01041/FUL	128	14	81	31	147	3	28	12	19
87	15/01041/FUL	26	3	16	6	30	1	6	2	4
87	15/01041/FUL	79	8	50	19	90	2	17	7	12
87	15/01041/FUL	10	1	6	2	11	0	2	1	1
23	IP136	17	2	11	4	19	0	4	2	2
72	IGS	118	13	74	28	135	3	25	11	17
72	IGS	64	7	41	15	74	1	14	6	9
72	IGS	41	4	26	10	47	1	9	4	6
72	IGS	37	4	23	9	42	1	8	3	5
72	IGS	30	3	19	7	34	1	6	3	4
91	IGS	95	10	60	23	109	2	20	9	14
91	IGS	33	4	21	8	38	1	7	3	5
72	IGS	66	7	42	16	76	1	14	6	10
72	IGS	15	2	9	4	17	0	3	1	2
72	IGS	16	2	10	4	18	0	3	1	2
72	IGS	8	1	5	2	9	0	2	1	1
72	IGS	7	1	4	2	8	0	1	1	1
91	IGS	15	2	9	4	17	0	3	1	2

Zone	Site Ref	Jobs	Car – EMPLOYMENT TRIPS							
			Commuting		Other		Education		Business	
			Production	Attraction	Production	Attraction	Production	Attraction	Production	Attraction
91	13/01073/P3JPA	16	2	10	4	18	0	3	1	2
91	13/01108/P3JPA	8	1	5	2	9	0	2	1	1
91	13/01110/P3JPA	7	1	4	2	8	0	1	1	1
64	14/00418/P3JPA	-133	-14	-84	-32	-153	-3	-29	-12	-19
18	14/00501/P3JPA	-5	-1	-3	-1	-6	0	-1	0	-1
5	14/00526/P3JPA	-97	-10	-61	-23	-111	-2	-21	-9	-14
302	14/00587/P3JPA	-12	-1	-8	-3	-14	0	-3	-1	-2
59	14/00743/P3JPA	-18	-2	-11	-4	-21	0	-4	-2	-3
25	14/00810/P3JPA	-2	0	-1	-1	-3	0	0	0	0
6	14/00904/P3JPA	-185	-20	-117	-44	-212	-4	-40	-17	-27
302	14/00949/P3JPA	-19	-2	-12	-4	-21	0	-4	-2	-3
31	15/00011/P3JPA	-703	-75	-444	-169	-806	-16	-152	-64	-103
302	06/00014/FUL	-12	-1	-8	-3	-14	0	-3	-1	-2
3	14/00097/VC	-11	-1	-7	-3	-12	0	-2	-1	-2
1	13/00360/FUL	-25	-3	-16	-6	-29	-1	-5	-2	-4
6	13/00891/FUL	-18	-2	-12	-4	-21	0	-4	-2	-3
5	14/00221/FUL	-20	-2	-12	-5	-22	0	-4	-2	-3
14	14/00438/FUL	-6	-1	-4	-2	-7	0	-1	-1	-1
6	14/00507/FUL	-16	-2	-10	-4	-18	0	-3	-1	-2
26	14/00678/FUL	-6	-1	-4	-1	-7	0	-1	-1	-1
3	14/00912/FUL	1	0	1	0	1	0	0	0	0
50	15/00120/FUL	-22	-2	-14	-5	-25	0	-5	-2	-3
19	14/00245/FUL	-48	-5	-30	-11	-55	-1	-10	-4	-7
30	14/00325/FUL	-17	-2	-11	-4	-20	0	-4	-2	-3
6	14/00656/FUL	-8	-1	-5	-2	-9	0	-2	-1	-1
197	13/01073/P3JPA	8	1	5	2	9	0	2	1	1
165	13/01108/P3JPA	-71	-8	-45	-17	-81	-2	-15	-6	-10
173	13/01110/P3JPA	-130	-14	-82	-31	-149	-3	-28	-12	-19

Zone	Site Ref	Jobs	Car – EMPLOYMENT TRIPS							
			Commuting		Other		Education		Business	
			Production	Attraction	Production	Attraction	Production	Attraction	Production	Attraction
80	14/00297/FUL	9	1	6	2	10	0	2	1	1
61	14/00368/FUL	1	0	1	0	1	0	0	0	0
27	14/00698/FUL	8	1	5	2	9	0	2	1	1
129	14/00940/FUL	70	7	44	17	80	2	15	6	10
901	Ipswich Fringe Site (Wolsey Grange)	480	51	303	115	550	11	103	44	70
901	Ipswich Fringe Site (Wolsey Grange)	571	61	361	137	655	13	123	52	83
901	Ipswich Fringe Site (Wolsey Grange)	750	80	474	180	860	17	162	68	109
901	Ipswich Fringe Site (Wolsey Grange)	188	20	118	45	215	4	40	17	27
160	B/7/01011, B/11/00118	369	39	233	89	423	8	80	33	54
160	B/1101514	30	3	19	7	34	1	6	3	4
160	London Road/Scrivener Drive	72	8	45	17	82	2	15	6	10
114	Former Sugar Beet Factory Site,	2131	228	1346	512	2442	48	459	193	311
160	B/15/00124	107	11	68	26	123	2	23	10	16
160	B/08/00873	231	25	146	55	264	5	50	21	34
193	Wherstead Park allocation	1056	113	667	254	1210	24	228	96	154
219	Orion Business Park, Gt. Blakenham	130	14	82	31	149	3	28	12	19
219	3054/12	43	5	27	10	49	1	9	4	6
235	C11/1987	206	22	130	50	237	5	44	19	30
304	C08/0486	203	22	128	49	233	5	44	18	30
235	C08/0626	66	7	42	16	76	2	14	6	10
304	C08/0486	203	22	128	49	233	5	44	18	30
231	C09/1964	20	2	12	5	22	0	4	2	3
231	C10/3040	444	48	281	107	509	10	96	40	65
232	C13/1214	43	5	27	10	49	1	9	4	6
221	DC/13/3408	313	33	197	75	358	7	67	28	46
240	C/09/0555	2000	214	1264	481	2292	45	431	181	292
197	Ransomes Europark extension	3810	407	2407	915	4366	86	821	345	556
197	Ransomes Europark extension	930	99	588	224	1066	21	201	84	136

Zone	Site Ref	Jobs	Car – EMPLOYMENT TRIPS							
			Commuting		Other		Education		Business	
			Production	Attraction	Production	Attraction	Production	Attraction	Production	Attraction
197	Ransomes Europark extension	541	58	342	130	620	12	117	49	79

Zone	Site Ref	Jobs	Bus – EMPLOYMENT TRIPS							
			Commuting		Other		Education		Business	
			Production	Attraction	Production	Attraction	Production	Attraction	Production	Attraction
197	06/00615/FUL	54	0	5	1	7	0	6	0	0
64	07/00641/FUL	40	0	4	1	5	0	4	0	0
80	08/00025/FUL	0	0	0	0	0	0	0	0	0
59	06/00838/FUL	152	1	14	3	19	0	17	0	1
197	07/00486/REM	160	1	14	3	20	0	18	0	1
14	07/00738/FUL	70	0	6	1	9	0	8	0	1
55	07/01047/FUL	30	0	3	1	4	0	3	0	0
31	07/00488/FUL	400	2	36	8	51	1	44	1	3
101	05/01010/FUL	250	1	23	5	32	1	28	1	2
30	08/00498/FUL	38	0	3	1	5	0	4	0	0
31	09/00554/FUL	15	0	1	0	2	0	2	0	0
197	10/00565/FUL	150	1	14	3	19	0	17	0	1
28	11/00173/FUL	4	0	0	0	1	0	0	0	0
64	08/00311/FUL	10	0	1	0	1	0	1	0	0
173	07/00729/FUL	131	1	12	3	17	0	15	0	1
197	Land Opposite To 21 The Havens	47	0	4	1	6	0	5	0	0
197	Land Opposite To 21 The Havens	35	0	3	1	4	0	4	0	0
197	Land Opposite To 21 The Havens	6	0	1	0	1	0	1	0	0
197	Land Opposite To 21 The Havens	0	0	0	0	0	0	0	0	0
190	06/00924/FUL	816	3	74	16	104	2	91	2	7
790	13/00229/FUL	8	0	1	0	1	0	1	0	0
54	11/00448/FUL	13	0	1	0	2	0	1	0	0
930	IP/11/00763/OUTFL	318	1	29	6	41	1	35	1	3
930	IP/11/00763/OUTFL	60	0	5	1	8	0	7	0	1
929	IP/11/00763/OUTFL	60	0	5	1	8	0	7	0	1
928	CS13(A)	301	1	27	6	39	1	33	1	3
927	CS13(B)	175	1	16	3	22	0	19	0	1
925	CS14	131	1	12	3	17	0	15	0	1

Zone	Site Ref	Jobs	Bus – EMPLOYMENT TRIPS							
			Commuting		Other		Education		Business	
			Production	Attraction	Production	Attraction	Production	Attraction	Production	Attraction
22	IP004	205	1	19	4	26	0	23	0	2
16	IP011b	53	0	5	1	7	0	6	0	0
917	IP015	78	0	7	2	10	0	9	0	1
23	IP035(A)	21	0	2	0	3	0	2	0	0
23	IP035(B)	37	0	3	1	5	0	4	0	0
3	IP040	631	3	57	12	81	1	70	1	5
26	IP043	54	0	5	1	7	0	6	0	0
914	IP051(A)	674	3	61	13	86	1	75	2	6
914	IP051(B)	884	4	80	18	113	2	98	2	7
914	IP051(C)	32	0	3	1	4	0	4	0	0
16	IP052	31	0	3	1	4	0	3	0	0
15	IP054	154	1	14	3	20	0	17	0	1
132	IP058	313	1	28	6	40	1	35	1	3
132	IP067	233	1	21	5	30	0	26	1	2
28	IP094	198	1	18	4	25	0	22	0	2
132	IP099	124	1	11	2	16	0	14	0	1
902	IP140(A)	347	1	31	7	44	1	39	1	3
902	IP140(B)	108	0	10	2	14	0	12	0	1
902	IP140(C)	164	1	15	3	21	0	18	0	1
197	IP146(A)	202	1	18	4	26	0	22	0	2
197	IP146(B)	215	1	19	4	28	0	24	0	2
76	IP147	253	1	23	5	32	1	28	1	2
185	IP150C(A)	704	3	64	14	90	1	78	2	6
185	IP150C(B)	296	1	27	6	38	1	33	1	2
185	IP152(A)	553	2	50	11	71	1	61	1	5
185	IP152(B)	174	1	16	3	22	0	19	0	1
800	IP047	366	2	33	7	47	1	41	1	3
581	IP049	201	1	18	4	26	0	22	0	2

Zone	Site Ref	Jobs	Bus – EMPLOYMENT TRIPS							
			Commuting		Other		Education		Business	
			Production	Attraction	Production	Attraction	Production	Attraction	Production	Attraction
155	IP005	25	0	2	0	3	0	3	0	0
33	IP258	19	0	2	0	2	0	2	0	0
18	IP260	34	0	3	1	4	0	4	0	0
37	IP037(A)	367	2	33	7	47	1	41	1	3
37	IP037(B)	90	0	8	2	12	0	10	0	1
37	IP037(C)	116	0	11	2	15	0	13	0	1
37	IP037(D)	33	0	3	1	4	0	4	0	0
23	IP132	14	0	1	0	2	0	2	0	0
87	15/01041/FUL	22	0	2	0	3	0	2	0	0
87	15/01041/FUL	44	0	4	1	6	0	5	0	0
87	15/01041/FUL	128	1	12	3	16	0	14	0	1
87	15/01041/FUL	26	0	2	1	3	0	3	0	0
87	15/01041/FUL	79	0	7	2	10	0	9	0	1
87	15/01041/FUL	10	0	1	0	1	0	1	0	0
23	IP136	17	0	2	0	2	0	2	0	0
72	IGS	118	0	11	2	15	0	13	0	1
72	IGS	64	0	6	1	8	0	7	0	1
72	IGS	41	0	4	1	5	0	5	0	0
72	IGS	37	0	3	1	5	0	4	0	0
72	IGS	30	0	3	1	4	0	3	0	0
91	IGS	95	0	9	2	12	0	11	0	1
91	IGS	33	0	3	1	4	0	4	0	0
72	IGS	66	0	6	1	8	0	7	0	1
72	IGS	15	0	1	0	2	0	2	0	0
72	IGS	16	0	1	0	2	0	2	0	0
72	IGS	8	0	1	0	1	0	1	0	0
72	IGS	7	0	1	0	1	0	1	0	0
91	IGS	15	0	1	0	2	0	2	0	0

Zone	Site Ref	Jobs	Bus – EMPLOYMENT TRIPS							
			Commuting		Other		Education		Business	
			Production	Attraction	Production	Attraction	Production	Attraction	Production	Attraction
91	13/01073/P3JPA	16	0	1	0	2	0	2	0	0
91	13/01108/P3JPA	8	0	1	0	1	0	1	0	0
91	13/01110/P3JPA	7	0	1	0	1	0	1	0	0
64	14/00418/P3JPA	-133	-1	-12	-3	-17	0	-15	0	-1
18	14/00501/P3JPA	-5	0	0	0	-1	0	-1	0	0
5	14/00526/P3JPA	-97	0	-9	-2	-12	0	-11	0	-1
302	14/00587/P3JPA	-12	0	-1	0	-2	0	-1	0	0
59	14/00743/P3JPA	-18	0	-2	0	-2	0	-2	0	0
25	14/00810/P3JPA	-2	0	0	0	0	0	0	0	0
6	14/00904/P3JPA	-185	-1	-17	-4	-24	0	-21	0	-2
302	14/00949/P3JPA	-19	0	-2	0	-2	0	-2	0	0
31	15/00011/P3JPA	-703	-3	-64	-14	-90	-1	-78	-2	-6
302	06/00014/FUL	-12	0	-1	0	-2	0	-1	0	0
3	14/00097/VC	-11	0	-1	0	-1	0	-1	0	0
1	13/00360/FUL	-25	0	-2	0	-3	0	-3	0	0
6	13/00891/FUL	-18	0	-2	0	-2	0	-2	0	0
5	14/00221/FUL	-20	0	-2	0	-3	0	-2	0	0
14	14/00438/FUL	-6	0	-1	0	-1	0	-1	0	0
6	14/00507/FUL	-16	0	-1	0	-2	0	-2	0	0
26	14/00678/FUL	-6	0	-1	0	-1	0	-1	0	0
3	14/00912/FUL	1	0	0	0	0	0	0	0	0
50	15/00120/FUL	-22	0	-2	0	-3	0	-2	0	0
19	14/00245/FUL	-48	0	-4	-1	-6	0	-5	0	0
30	14/00325/FUL	-17	0	-2	0	-2	0	-2	0	0
6	14/00656/FUL	-8	0	-1	0	-1	0	-1	0	0
197	13/01073/P3JPA	8	0	1	0	1	0	1	0	0
165	13/01108/P3JPA	-71	0	-6	-1	-9	0	-8	0	-1
173	13/01110/P3JPA	-130	-1	-12	-3	-17	0	-14	0	-1

Zone	Site Ref	Jobs	Bus – EMPLOYMENT TRIPS							
			Commuting		Other		Education		Business	
			Production	Attraction	Production	Attraction	Production	Attraction	Production	Attraction
80	14/00297/FUL	9	0	1	0	1	0	1	0	0
61	14/00368/FUL	1	0	0	0	0	0	0	0	0
27	14/00698/FUL	8	0	1	0	1	0	1	0	0
129	14/00940/FUL	70	0	6	1	9	0	8	0	1
901	Ipswich Fringe Site (Wolsey Grange)	480	2	43	10	61	1	53	1	4
901	Ipswich Fringe Site (Wolsey Grange)	571	2	52	11	73	1	63	1	5
901	Ipswich Fringe Site (Wolsey Grange)	750	3	68	15	96	2	83	2	6
901	Ipswich Fringe Site (Wolsey Grange)	188	1	17	4	24	0	21	0	2
160	B/7/01011, B/11/00118	369	2	33	7	47	1	41	1	3
160	B/1101514	30	0	3	1	4	0	3	0	0
160	London Road/Scrivener Drive	72	0	6	1	9	0	8	0	1
114	Former Sugar Beet Factory Site,	2131	9	193	42	273	4	237	5	18
160	B/15/00124	107	0	10	2	14	0	12	0	1
160	B/08/00873	231	1	21	5	30	0	26	1	2
193	Wherstead Park allocation	1056	4	96	21	135	2	117	2	9
219	Orion Business Park, Gt. Blakenham	130	1	12	3	17	0	14	0	1
219	3054/12	43	0	4	1	6	0	5	0	0
235	C11/1987	206	1	19	4	26	0	23	0	2
304	C08/0486	203	1	18	4	26	0	23	0	2
235	C08/0626	66	0	6	1	8	0	7	0	1
304	C08/0486	203	1	18	4	26	0	23	0	2
231	C09/1964	20	0	2	0	3	0	2	0	0
231	C10/3040	444	2	40	9	57	1	49	1	4
232	C13/1214	43	0	4	1	5	0	5	0	0
221	DC/13/3408	313	1	28	6	40	1	35	1	3
240	C/09/0555	2000	8	181	40	256	4	222	5	17
197	Ransomes Europark extension	3810	16	345	75	488	8	423	9	32
197	Ransomes Europark extension	930	4	84	18	119	2	103	2	8

Zone	Site Ref	Jobs	Bus – EMPLOYMENT TRIPS							
			Commuting		Other		Education		Business	
			Production	Attraction	Production	Attraction	Production	Attraction	Production	Attraction
197	Ransomes Europark extension	541	2	49	11	69	1	60	1	5

Zone	Site Ref	Jobs	Active – Employment Trips							
			Commuting		Other		Education		Activeiness	
			Production	Attraction	Production	Attraction	Production	Attraction	Production	Attraction
197	06/00615/FUL	54	2	8	10	34	1	9	1	1
64	07/00641/FUL	40	2	6	7	25	1	7	1	1
80	08/00025/FUL	0	0	0	0	0	0	0	0	0
59	06/00838/FUL	152	7	21	27	96	3	27	3	3
197	07/00486/REM	160	7	22	29	101	3	28	3	3
14	07/00738/FUL	70	3	10	13	44	1	12	1	1
55	07/01047/FUL	30	1	4	5	19	1	5	1	1
31	07/00488/FUL	400	17	56	72	252	7	70	7	9
101	05/01010/FUL	250	11	35	45	157	4	44	4	5
30	08/00498/FUL	38	2	5	7	24	1	7	1	1
31	09/00554/FUL	15	1	2	3	10	0	3	0	0
197	10/00565/FUL	150	6	21	27	94	3	26	3	3
28	11/00173/FUL	4	0	1	1	3	0	1	0	0
64	08/00311/FUL	10	0	1	2	6	0	2	0	0
173	07/00729/FUL	131	6	18	23	82	2	23	2	3
197	Land Opposite To 21 The Havens	47	2	7	8	30	1	8	1	1
197	Land Opposite To 21 The Havens	35	1	5	6	22	1	6	1	1
197	Land Opposite To 21 The Havens	6	0	1	1	4	0	1	0	0
197	Land Opposite To 21 The Havens	0	0	0	0	0	0	0	0	0
190	06/00924/FUL	816	35	113	146	513	14	143	14	17
790	13/00229/FUL	8	0	1	1	5	0	1	0	0
54	11/00448/FUL	13	1	2	2	8	0	2	0	0
930	IP/11/00763/OUTFL	318	14	44	57	200	6	56	6	7
930	IP/11/00763/OUTFL	60	3	8	11	38	1	11	1	1
929	IP/11/00763/OUTFL	60	3	8	11	38	1	11	1	1
928	CS13(A)	301	13	42	54	189	5	53	5	6
927	CS13(B)	175	7	24	31	110	3	31	3	4
925	CS14	131	6	18	23	82	2	23	2	3

Zone	Site Ref	Jobs	Active – EMPLOYMENT TRIPS							
			Commuting		Other		Education		Activeiness	
			Production	Attraction	Production	Attraction	Production	Attraction	Production	Attraction
22	IP004	205	9	29	37	129	4	36	4	4
16	IP011b	53	2	7	9	33	1	9	1	1
917	IP015	78	3	11	14	49	1	14	1	2
23	IP035(A)	21	1	3	4	13	0	4	0	0
23	IP035(B)	37	2	5	7	23	1	7	1	1
3	IP040	631	27	88	113	397	11	111	11	13
26	IP043	54	2	8	10	34	1	9	1	1
914	IP051(A)	674	29	94	121	424	12	119	12	14
914	IP051(B)	884	38	123	158	556	16	155	16	19
914	IP051(C)	32	1	4	6	20	1	6	1	1
16	IP052	31	1	4	6	20	1	5	1	1
15	IP054	154	7	21	28	97	3	27	3	3
132	IP058	313	13	44	56	197	5	55	5	7
132	IP067	233	10	32	42	147	4	41	4	5
28	IP094	198	8	28	35	125	3	35	3	4
132	IP099	124	5	17	22	78	2	22	2	3
902	IP140(A)	347	15	48	62	218	6	61	6	7
902	IP140(B)	108	5	15	19	68	2	19	2	2
902	IP140(C)	164	7	23	29	103	3	29	3	4
197	IP146(A)	202	9	28	36	127	4	36	4	4
197	IP146(B)	215	9	30	39	135	4	38	4	5
76	IP147	253	11	35	45	159	4	44	4	5
185	IP150C(A)	704	30	98	126	443	12	124	12	15
185	IP150C(B)	296	13	41	53	186	5	52	5	6
185	IP152(A)	553	24	77	99	348	10	97	10	12
185	IP152(B)	174	7	24	31	109	3	31	3	4
800	IP047	366	16	51	66	230	6	64	6	8
581	IP049	201	9	28	36	126	4	35	4	4

Zone	Site Ref	Jobs	Active – EMPLOYMENT TRIPS							
			Commuting		Other		Education		Activeiness	
			Production	Attraction	Production	Attraction	Production	Attraction	Production	Attraction
155	IP005	25	1	3	4	16	0	4	0	1
33	IP258	19	1	3	3	12	0	3	0	0
18	IP260	34	1	5	6	21	1	6	1	1
37	IP037(A)	367	16	51	66	231	6	65	6	8
37	IP037(B)	90	4	13	16	57	2	16	2	2
37	IP037(C)	116	5	16	21	73	2	20	2	2
37	IP037(D)	33	1	5	6	21	1	6	1	1
23	IP132	14	1	2	3	9	0	2	0	0
87	15/01041/FUL	22	1	3	4	14	0	4	0	0
87	15/01041/FUL	44	2	6	8	28	1	8	1	1
87	15/01041/FUL	128	5	18	23	81	2	23	2	3
87	15/01041/FUL	26	1	4	5	16	0	5	0	1
87	15/01041/FUL	79	3	11	14	50	1	14	1	2
87	15/01041/FUL	10	0	1	2	6	0	2	0	0
23	IP136	17	1	2	3	11	0	3	0	0
72	IGS	118	5	16	21	74	2	21	2	3
72	IGS	64	3	9	12	40	1	11	1	1
72	IGS	41	2	6	7	26	1	7	1	1
72	IGS	37	2	5	7	23	1	6	1	1
72	IGS	30	1	4	5	19	1	5	1	1
91	IGS	95	4	13	17	60	2	17	2	2
91	IGS	33	1	5	6	21	1	6	1	1
72	IGS	66	3	9	12	42	1	12	1	1
72	IGS	15	1	2	3	9	0	3	0	0
72	IGS	16	1	2	3	10	0	3	0	0
72	IGS	8	0	1	1	5	0	1	0	0
72	IGS	7	0	1	1	4	0	1	0	0
91	IGS	15	1	2	3	9	0	3	0	0

Zone	Site Ref	Jobs	Active – EMPLOYMENT TRIPS							
			Commuting		Other		Education		Activeiness	
			Production	Attraction	Production	Attraction	Production	Attraction	Production	Attraction
91	13/01073/P3JPA	16	1	2	3	10	0	3	0	0
91	13/01108/P3JPA	8	0	1	1	5	0	1	0	0
91	13/01110/P3JPA	7	0	1	1	4	0	1	0	0
64	14/00418/P3JPA	-133	-6	-19	-24	-84	-2	-23	-2	-3
18	14/00501/P3JPA	-5	0	-1	-1	-3	0	-1	0	0
5	14/00526/P3JPA	-97	-4	-13	-17	-61	-2	-17	-2	-2
302	14/00587/P3JPA	-12	-1	-2	-2	-8	0	-2	0	0
59	14/00743/P3JPA	-18	-1	-3	-3	-11	0	-3	0	0
25	14/00810/P3JPA	-2	0	0	0	-1	0	0	0	0
6	14/00904/P3JPA	-185	-8	-26	-33	-116	-3	-33	-3	-4
302	14/00949/P3JPA	-19	-1	-3	-3	-12	0	-3	0	0
31	15/00011/P3JPA	-703	-30	-98	-126	-442	-12	-124	-12	-15
302	06/00014/FUL	-12	-1	-2	-2	-8	0	-2	0	0
3	14/00097/VC	-11	0	-1	-2	-7	0	-2	0	0
1	13/00360/FUL	-25	-1	-3	-4	-16	0	-4	0	-1
6	13/00891/FUL	-18	-1	-3	-3	-12	0	-3	0	0
5	14/00221/FUL	-20	-1	-3	-4	-12	0	-3	0	0
14	14/00438/FUL	-6	0	-1	-1	-4	0	-1	0	0
6	14/00507/FUL	-16	-1	-2	-3	-10	0	-3	0	0
26	14/00678/FUL	-6	0	-1	-1	-4	0	-1	0	0
3	14/00912/FUL	1	0	0	0	1	0	0	0	0
50	15/00120/FUL	-22	-1	-3	-4	-14	0	-4	0	0
19	14/00245/FUL	-48	-2	-7	-9	-30	-1	-8	-1	-1
30	14/00325/FUL	-17	-1	-2	-3	-11	0	-3	0	0
6	14/00656/FUL	-8	0	-1	-1	-5	0	-1	0	0
197	13/01073/P3JPA	8	0	1	1	5	0	1	0	0
165	13/01108/P3JPA	-71	-3	-10	-13	-45	-1	-12	-1	-2
173	13/01110/P3JPA	-130	-6	-18	-23	-82	-2	-23	-2	-3

Zone	Site Ref	Jobs	Active – EMPLOYMENT TRIPS							
			Commuting		Other		Education		Activeiness	
			Production	Attraction	Production	Attraction	Production	Attraction	Production	Attraction
80	14/00297/FUL	9	0	1	2	6	0	2	0	0
61	14/00368/FUL	1	0	0	0	1	0	0	0	0
27	14/00698/FUL	8	0	1	1	5	0	1	0	0
129	14/00940/FUL	70	3	10	13	44	1	12	1	1
901	Ipswich Fringe Site (Wolsey Grange)	480	21	67	86	302	8	84	8	10
901	Ipswich Fringe Site (Wolsey Grange)	571	24	79	102	360	10	100	10	12
901	Ipswich Fringe Site (Wolsey Grange)	750	32	104	134	472	13	132	13	16
901	Ipswich Fringe Site (Wolsey Grange)	188	8	26	34	118	3	33	3	4
160	B/7/01011, B/11/00118	369	16	51	66	232	6	65	6	8
160	B/1101514	30	1	4	5	19	1	5	1	1
160	London Road/Scrivener Drive	72	3	10	13	45	1	13	1	2
114	Former Sugar Beet Factory Site,	2131	91	296	382	1341	37	375	37	46
160	B/15/00124	107	5	15	19	67	2	19	2	2
160	B/08/00873	231	10	32	41	145	4	41	4	5
193	Wherstead Park allocation	1056	45	147	189	664	19	186	19	23
219	Orion Business Park, Gt. Blakenham	130	6	18	23	82	2	23	2	3
219	3054/12	43	2	6	8	27	1	8	1	1
235	C11/1987	206	9	29	37	130	4	36	4	4
304	C08/0486	203	9	28	36	128	4	36	4	4
235	C08/0626	66	3	9	12	42	1	12	1	1
304	C08/0486	203	9	28	36	128	4	36	4	4
231	C09/1964	20	1	3	4	12	0	3	0	0
231	C10/3040	444	19	62	80	280	8	78	8	9
232	C13/1214	43	2	6	8	27	1	8	1	1
221	DC/13/3408	313	13	43	56	197	5	55	5	7
240	C/09/0555	2000	86	278	358	1258	35	352	35	43
197	Ransomes Europark extension	3810	163	530	683	2397	67	670	67	81
197	Ransomes Europark extension	930	40	129	167	585	16	164	16	20

Zone	Site Ref	Jobs	Active – EMPLOYMENT TRIPS							
			Commuting		Other		Education		Activeiness	
			Production	Attraction	Production	Attraction	Production	Attraction	Production	Attraction
197	Ransomes Europark extension	541	23	75	97	340	9	95	9	12

Appendix C

EMME (DEMAND MODEL) TECHNICAL NOTE

Ipswich Core Strategy

TECHNICAL NOTE 1: ITAMS DEMAND AND PUBLIC TRANSPORT MODELLING

QM

Job Number	Date	Author	Checked	Authorised
70007052-PF6	9 May 2016	M Swiderski	M Chilvers	M Chilvers

INTRODUCTION

WSP | Parsons Brinckerhoff has been commissioned by Suffolk County Council to undertake transport modelling to assess potential future transport network capacity issues arising in Ipswich consistent with transport demand and supply assumptions associated with the Ipswich Core Strategy.

WSP | Parsons Brinckerhoff have agreed to present a 'Do Minimum' scenario containing all consented and allocated development up to the target forecast year 2031, as well as consented schemes and S106 schemes associated with major developments. This Do Minimum scenario assumed the Ipswich Wet Dock Crossing has been built given recent confirmation of funding in the March 2016 Budget.

This technical note is concerned specifically with updates applied to the demand and public transport models within the Ipswich Transport Analysis Modelling Suite (ITAMS). Following a review of proposed land-use developments across the Ipswich area, these models were updated to incorporate proposed land-use developments which are associated with the co-strategy growth. In addition, public transport/walk network mitigation measures associated with the Adastral Park, Futura Park and Ipswich Garden Suburb developments were incorporated.

EXISTING TRANSPORT MODEL

WSP | Parsons Brinckerhoff received the Ipswich Transport Analysis Modelling Suite (ITAMS) from Suffolk County Council for the purposes of assessing the impacts on the transport network and benefits of the proposed Wet Dock Bridge scheme. It has been agreed that the version of ITAMS developed as part of the Wet Dock modelling will be used as the starting point for this work.

The ITAMS model is a multi-modal variable demand model created by Faber Maunsell | AECOM and is calibrated to a 2008 base year. The model covers the entirety of Ipswich town centre, extends as far west as the A14 and as far east as the A12, with the A14 to the south.

In addition to being used for the Wet Dock Bridge assessment, it was also used to support a major scheme business case submission in 2008 and was reviewed and agreed by both the Department for Transport (DfT) and Highways England (then the Highways Agency).

MODEL UPDATES

Demand

Following a review of proposed land-use developments across the Ipswich area, 2031 demand matrices were developed incorporating proposed land-use developments assumed within the Core Strategy. This included developments which are dependent on the completion of the Wet Dock Bridge. 2031 demand was

developed specifically for this project by adjusting TEMPro trip generation assumptions to be reflective of 2031 Local Plan development levels. Assumed Local Plan development levels are shown in Table 1.

Table 1 – Assumed Local Plan Development Levels

AREA		2031 FORECAST
Ipswich	Jobs	75,039
	Households	61,987
Mid Suffolk	Jobs	49,170
	Households	47,966
Suffolk Coastal	Jobs	58,310
	Households	62,883
Babergh	Jobs	36,444
	Households	43,427

New A12 Foot/Cycle Bridge

As part of the Adastral Park development, a new foot/cycle bridge is proposed across the A12 to provide a direct link between the development and Martlesham Heath. This has been added into the demand and public transport models as shown in Figure 1.

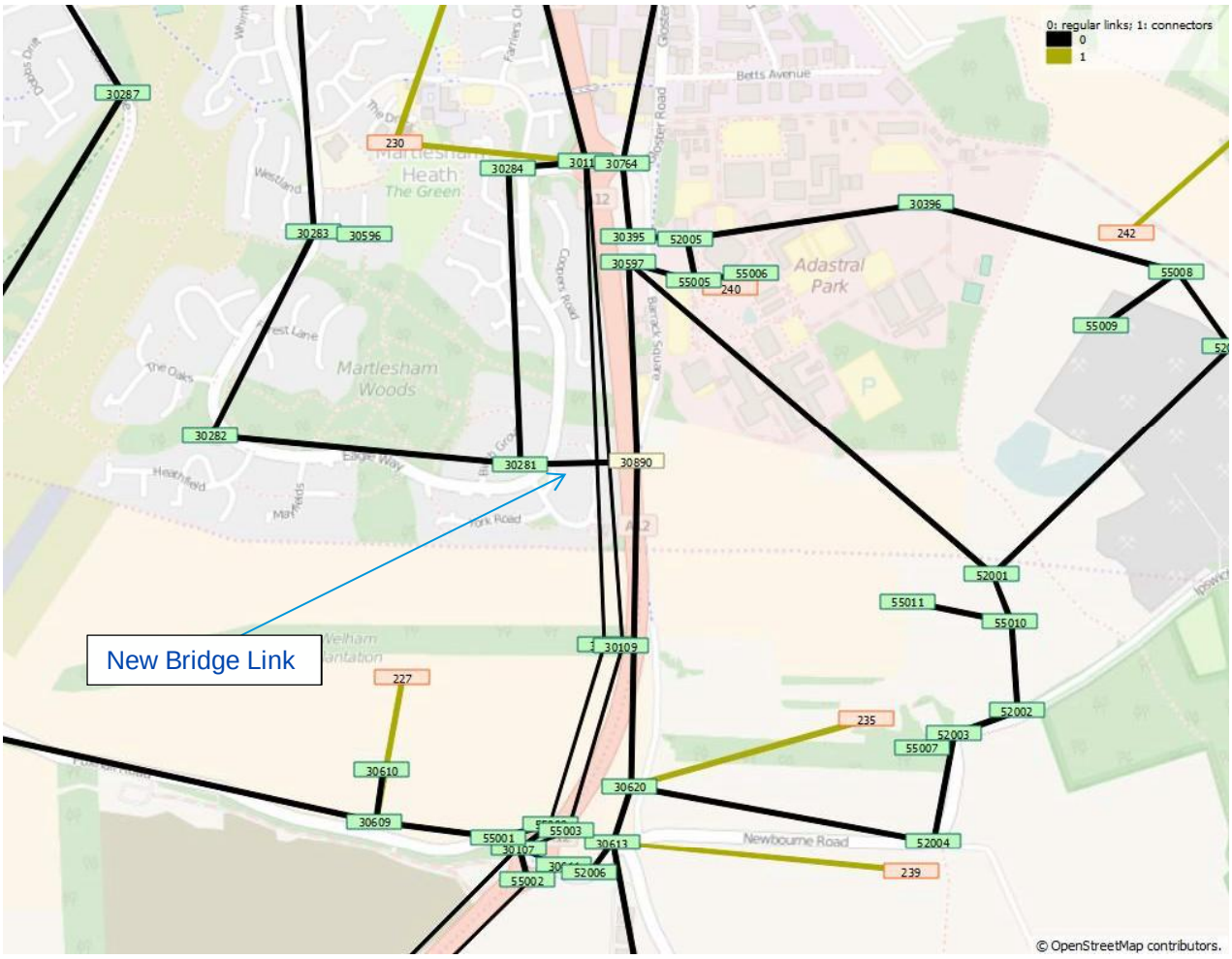

Figure 1 – ITAMS Demand and Public Transport Models with A12 Foot/Cycle Bridge

New Bus Route 66M

As part of the Adastral Park development, a new 66M bus route is proposed between the development and Ipswich town centre and railway station. It will provide a similar service to the existing 66 bus route except unlike route 66 it will undertake a loop of Adastral Park and not serve the Martlesham Heath, Grange Farm and Kesgrave estates. This has been added into the demand and public transport models as shown in Figure 2.

Figure 2 - ITAMS Demand and Public Transport Models - New Bus Route 66M

New Bus Route A

As part of the Adastral Park development, a new A bus route is proposed to serve the development, Martlesham Tesco, Martlesham and Woodbridge. This has been added into the demand and public transport models as shown in Figure 3.

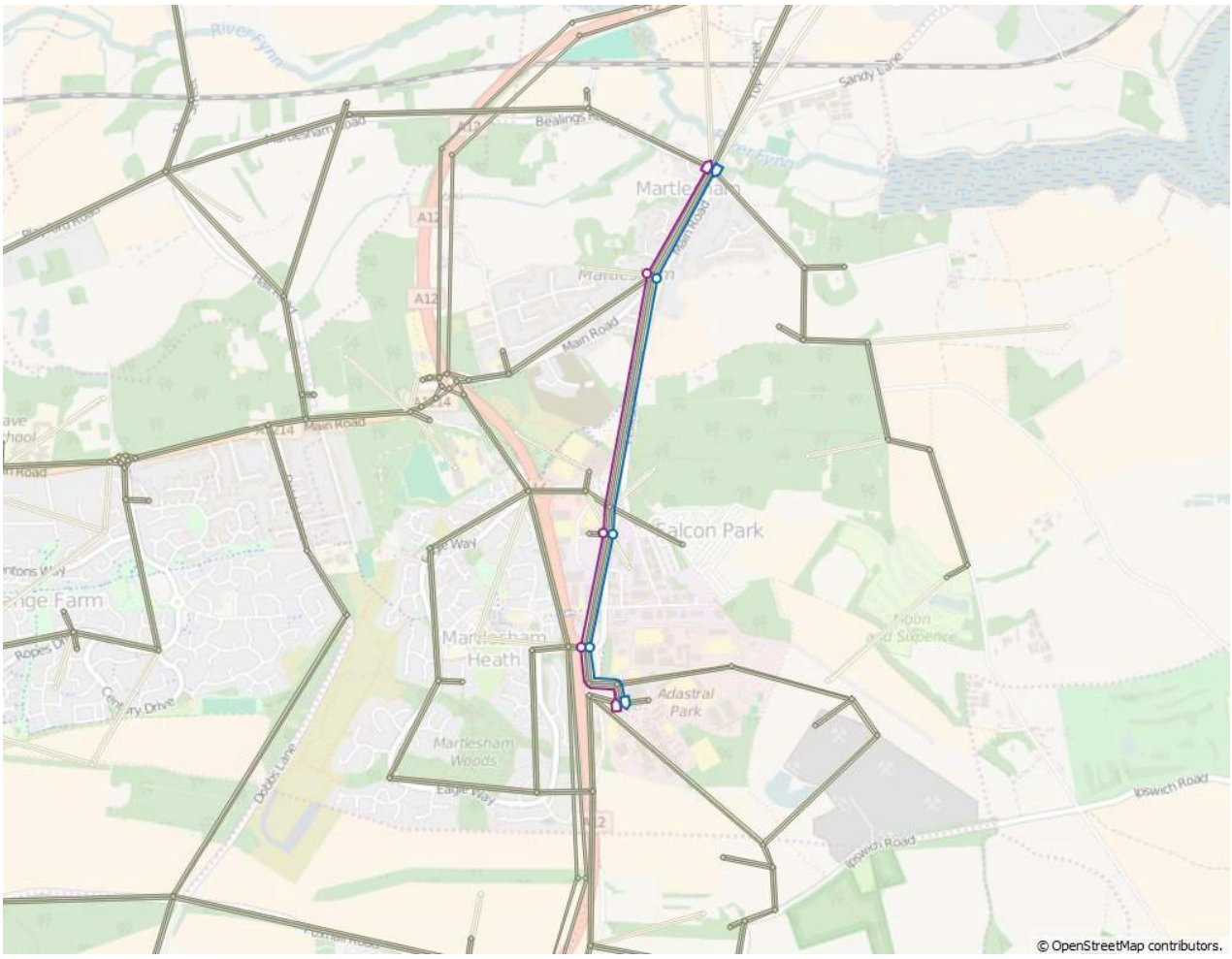

Figure 3 – ITAMS Demand and Public Transport Models - New Bus Route A

Rerouted Bus Route 66B (now Bus Route 67)

As part of the Adastral Park development, it is proposed to reroute the existing 66B bus route at the junction between Foxhall Road and A12 to undertake a loop of the development via Newbourne Road (the service currently serves the A12). This has been applied in the demand and public transport models as shown in Figure 4.

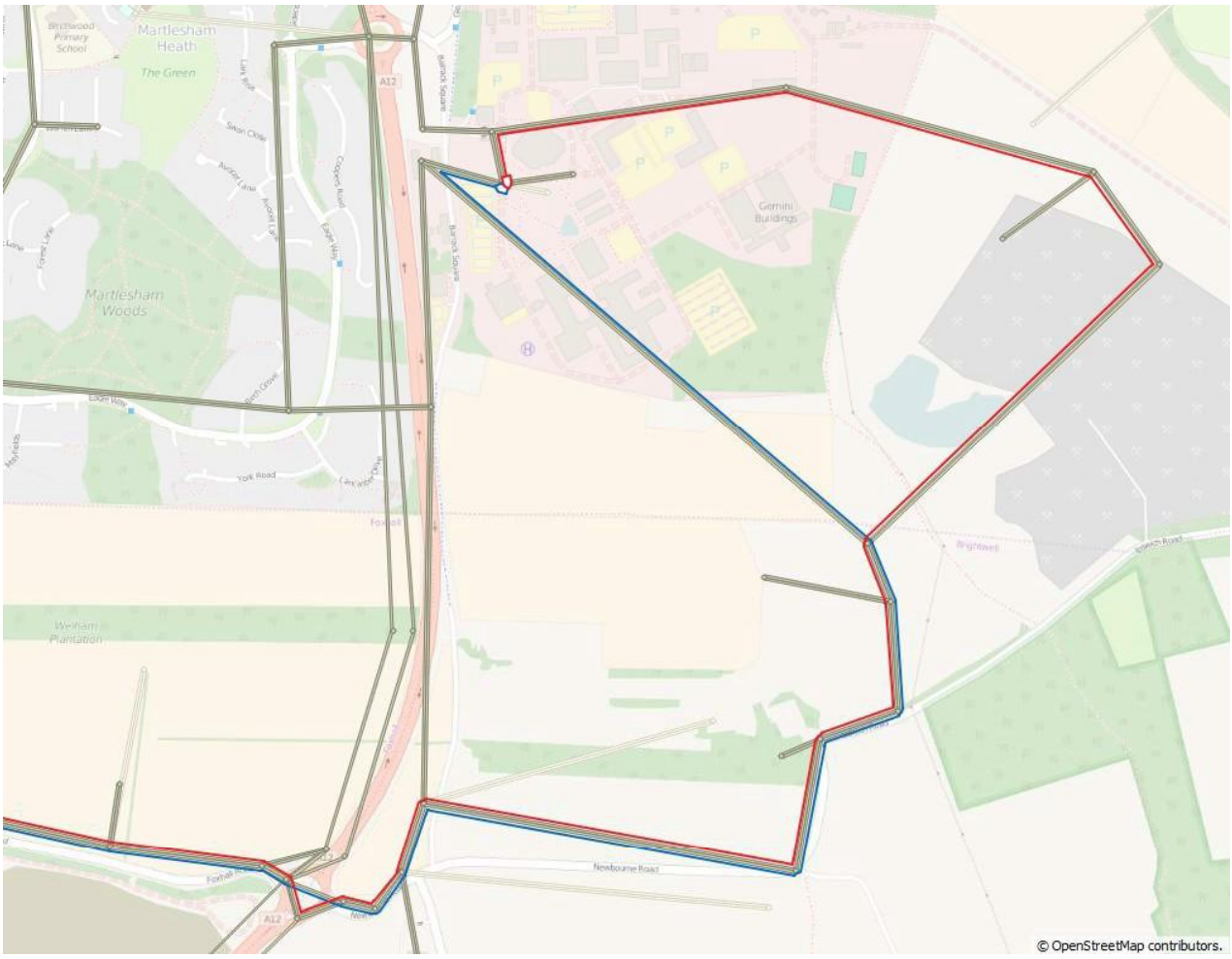

Figure 4 - ITAMS Demand and Public Transport Models - Rerouted Bus Route 66B

New Bus Stops and Rerouted Bus Route 6

As part of the Futura Park development, two new bus stops (serving each direction of travel) are to be provided on the estate road leading northwards from Ransomes Way. It is also proposed to reroute the existing 6 bus route via the internal estate roads of the development and for it to stop at the new bus stops. These updates been applied in the demand and public transport models as shown in Figure 5.

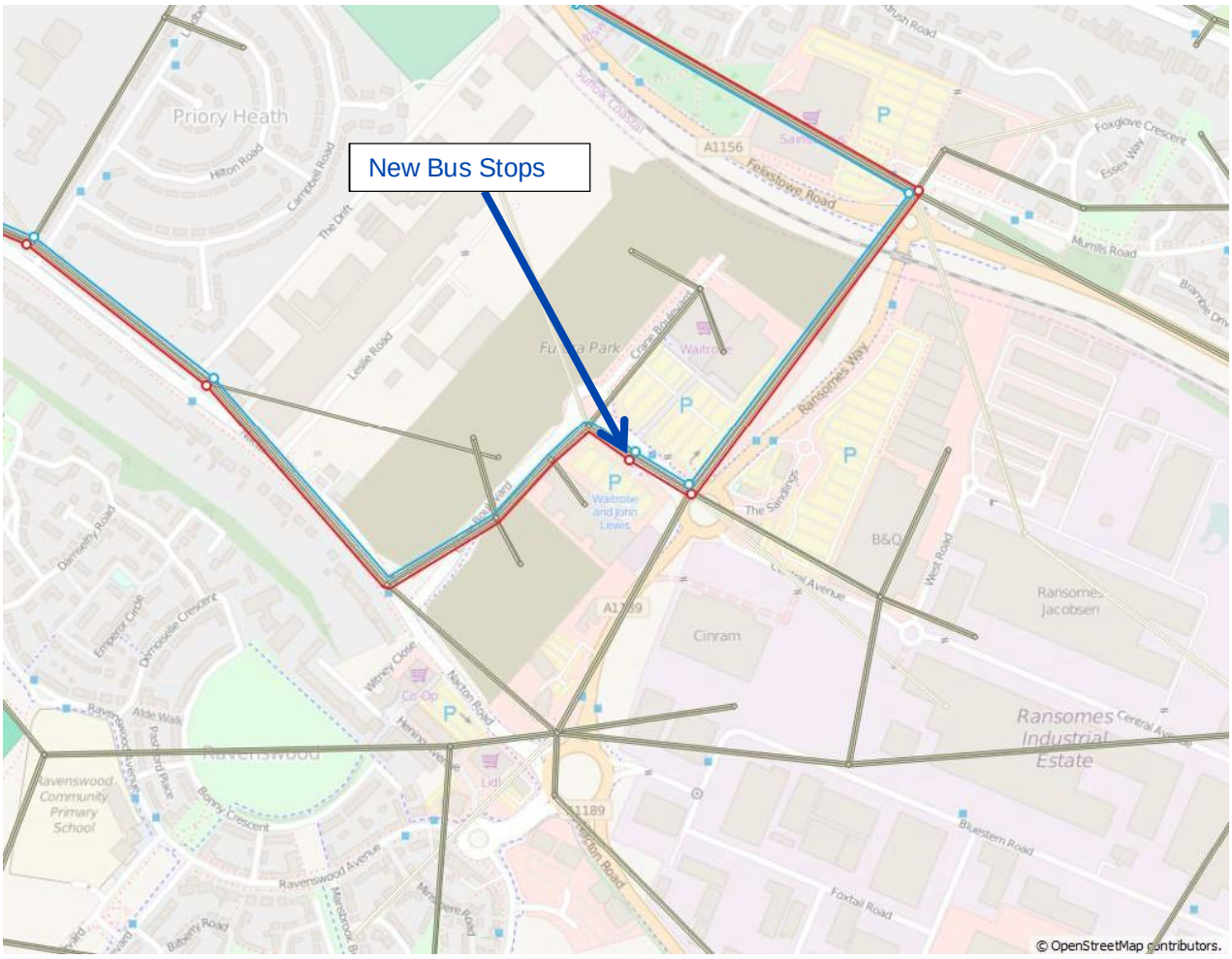

Figure 5 - ITAMS Demand and Public Transport Models – New Bus Stops and Rerouted Bus Route 6

New Bus Routes – Ipswich Garden Suburb

As part of the Ipswich Garden Suburb development, two new bus services are proposed between Ipswich Garden Suburb and the Tower Ramparts bus station. The services are proposed to serve Westerfield Road, with one service then looping around the eastern portion of the development and the other service looping around the western portion of the development. Owing to the network detail of the model in the area, it has only been possible to represent the Westerfield Road portion of the services as shown in Figure 6. The accessibility provided by the services within the development has instead been represented by new centroid connectors shown below.

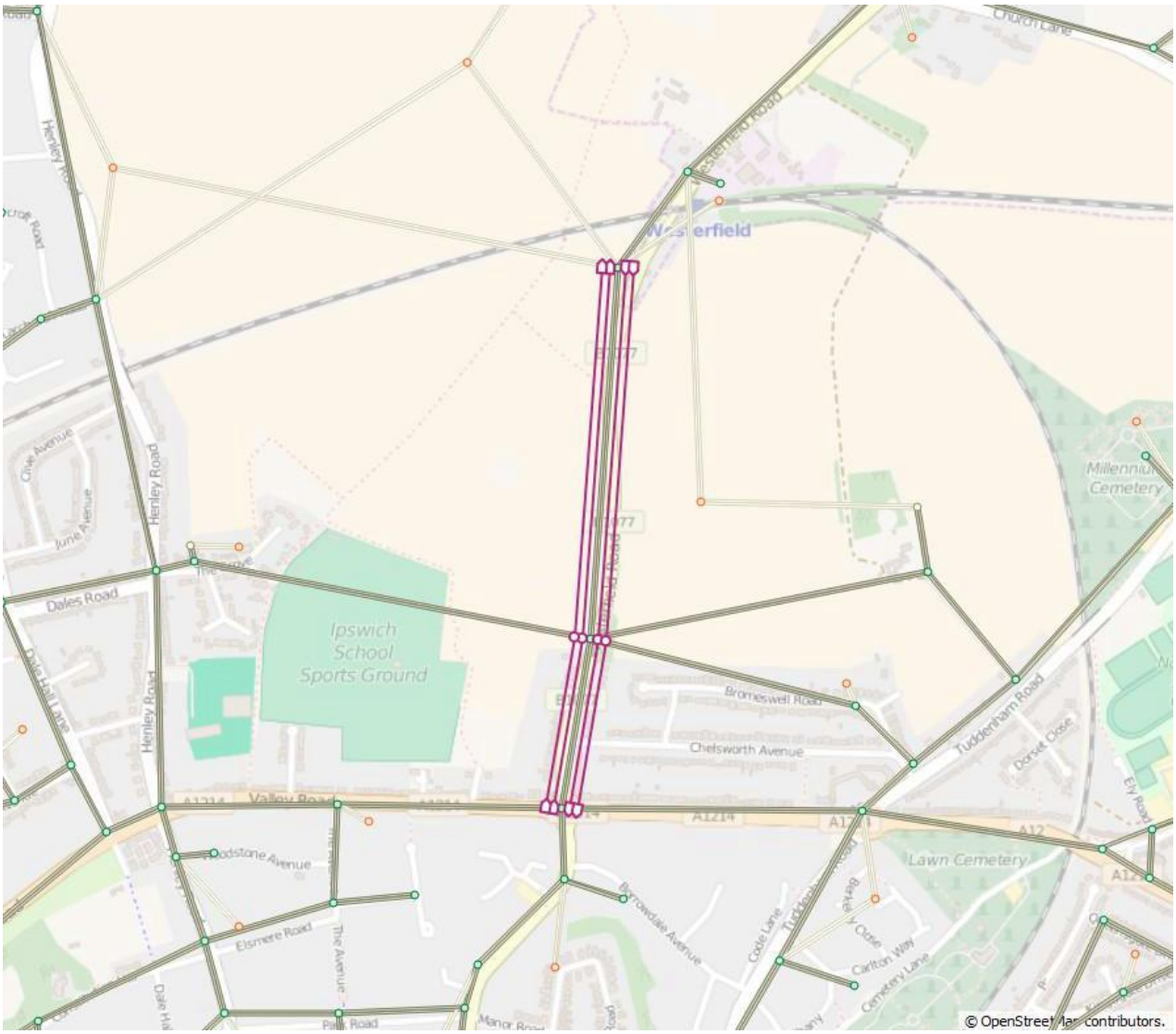

Figure 6 - ITAMS Demand and Public Transport Models – New Bus Routes serving Ipswich Garden Suburb

Revised Zone Centroid Connectors

The way in which the model zones containing the developments are connected to the transport network was reviewed. These connections were subsequently updated to best reflect the locations on the road network from which the developments would be accessed. These connections are shown in Figures 7 to 9.

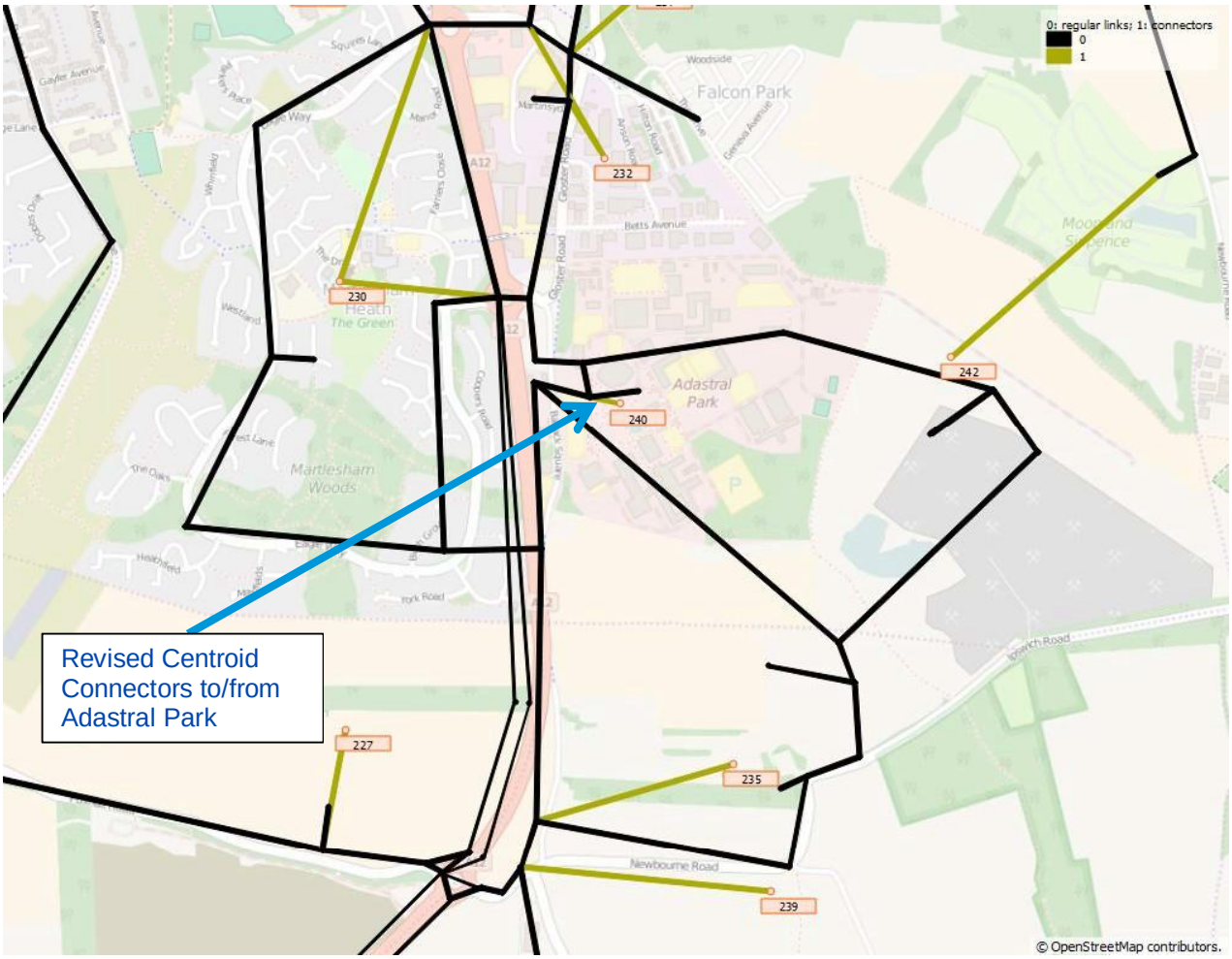

Figure 7 - ITAMS Demand and Public Transport Models – New Centroid Connectors to/from Adastral Park Development (zone 240)

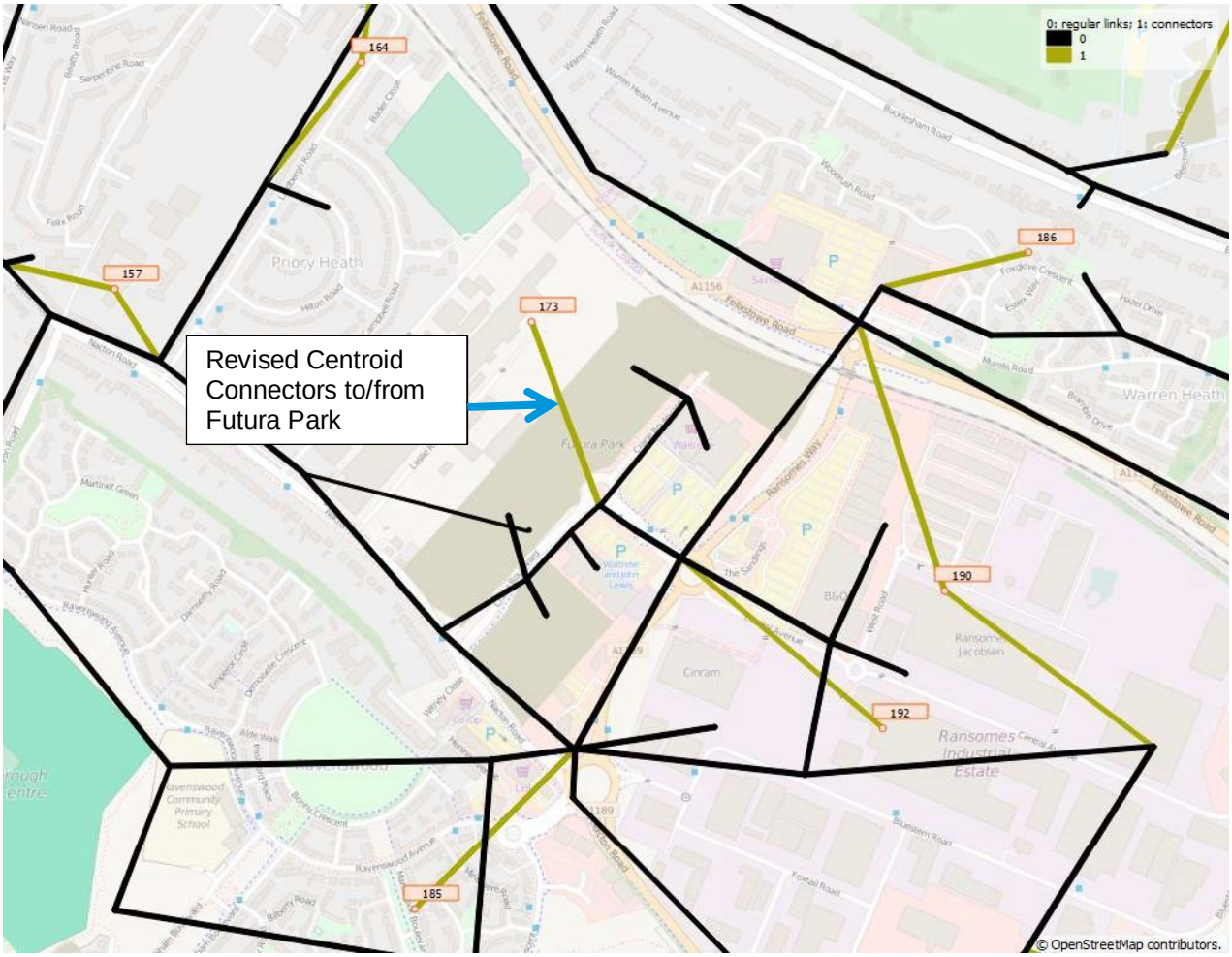

Figure 8 - ITAMS Demand and Public Transport Models – New Centroid Connectors to/from Futura Park Development (zone 173)

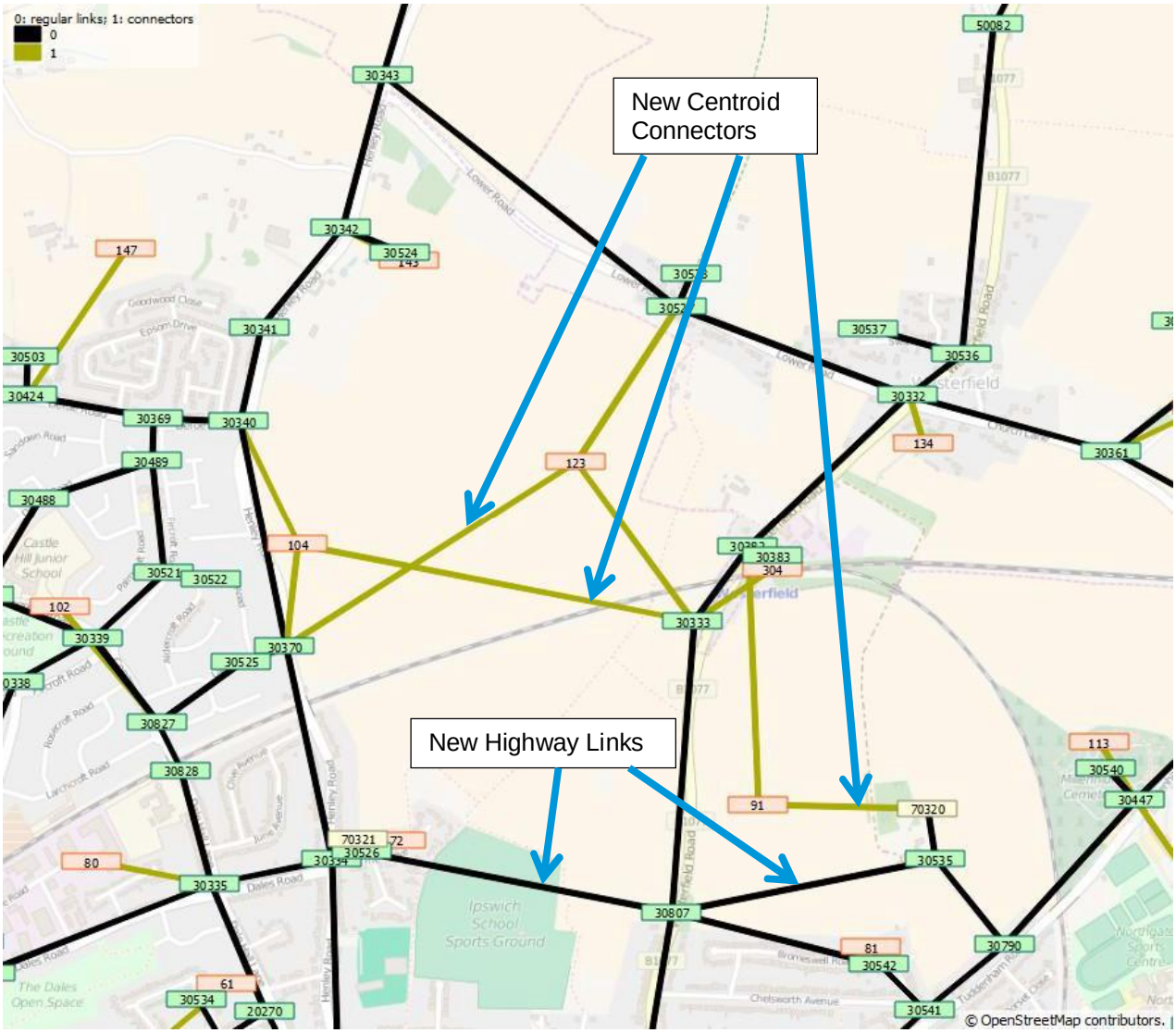

Figure 9 - ITAMS Demand and Public Transport Models – New Centroid Connectors and Links to/from Ipswich Garden Suburb

Service Frequencies

The frequencies of all the bus services identified in this note have been reviewed against the frequencies set out in the Transport Assessments for the developments. The assumed frequencies of the services are shown in Table 2.

Table 2 – Assumed Bus Service Frequencies (Buses Per Hour)

	Route No						
	66	66M	66B	A	6	Garden Suburb Route 1	Garden Suburb Route 2
AM Peak	4	6	6	2	3	4	4
Inter Peak	4	6	6	2	3	4	4
PM Peak	4	6	6	2	3	4	4
Off Peak	4	6	-	2	3	4	4

Bus Transit Times

Times between stops on new routes were based either on existing bus coding (where links are shared with existing bus routes) or calculated based on a bus transit speed of 25km/hr and distance between stops.

Bus Stopping Patterns

Stopping patterns on new routes were determined using a combination of existing bus route coding (where links are shared between bus routes) and route descriptions from the Transport Assessments for the developments.

Implementation of network updates within ITAMS

All the network updates described in this section plus the Wet Dock Bridge were applied to the 2031 Do Nothing networks (AM/Inter-Peak/PM/Off-Peak) developed as part of Wet Dock Modelling. The resulting networks (AM/Inter-Peak/PM/Off-Peak) were subsequently used in all scenarios modelled as part of this study.

The network updates have been recorded in EMME macros/batch files and can therefore be applied within ITAMS by running the macros/batch files. The macros/batch files and the way in which they are applied within ITAMS are detailed in Table 3.

Table 3 – Application of Ipswich Core Strategy network updates within ITAMS Demand and Public Transport Models

Databank	EMME Scenario no.	Scenario Description	Actions/Comments	Macros/batch files used
Z:\70007052 - Ipswich Core Strategy Transport Modelling\D Design and Analysis\Development\EMME\Copy_of_MSBC_2036_for_ICS_coding\Model\Ipswich_Core_Strategy_TA_Mitigation_Coding\Database	2	Ipswich Core Strategy 2031 AM Do Minimum	Wet Dock 2031 AM Do Nothing Scenario + Ipswich Wet Dock + TA (Adastral Park/Futura Park/Ipswich Garden Suburb) Mitigation Network Updates	> Updates to be applied in following order (to Wet Dock scenario): > AM_2016-02-19-none-1.mac > AM_2016-02-24-none-1.mac > AM_2016-02-25-none-1.mac > AM_2016-02-26-none-1.mac > 66bin_IP.224 > 2016-05-04-none-1.mac > 2016-05-04-none-2.mac > 2016-05-04-none-3.mac > 6_update.221
	4	Ipswich Core Strategy 2031 IP Do Minimum	Wet Dock 2031 IP Do Nothing Scenario + Ipswich Wet Dock + TA (Adastral Park/Futura Park/Ipswich Garden Suburb) Mitigation Network Updates	> Updates to be applied in following order (to Wet Dock scenario): > AM_2016-02-19-none-1.mac > AM_2016-02-24-none-1.mac > IP_2016-02-25-none-1.mac > IP_2016-02-29-none-1.mac > AM_2016-02-26-none-1.mac > 66bout_AM.224 > 2016-05-04-none-1.mac > 2016-05-04-none-2.mac > 2016-05-04-none-3.mac > 6_update.221
	6	Ipswich Core Strategy 2031 PM Do Minimum	Wet Dock 2031 PM Do Nothing Scenario + Ipswich Wet Dock + TA (Adastral Park/Futura Park/Ipswich Garden Suburb) Mitigation Network Updates	> Updates to be applied in following order (to Wet Dock scenario): > AM_2016-02-19-none-1.mac > AM_2016-02-24-none-1.mac > IP_2016-02-25-none-1.mac > IP_2016-02-29-none-1.mac > AM_2016-02-26-none-1.mac > 66bout_AM.224 > 2016-05-04-none-1.mac > 2016-05-04-none-2.mac > 2016-05-04-none-3.mac > 6_update.221
	8	Ipswich Core Strategy 2031 OP Do Minimum	Wet Dock 2031 OP Do Nothing Scenario + Ipswich Wet Dock + TA (Adastral Park/Futura Park/Ipswich Garden Suburb) Mitigation Network Updates	> Updates to be applied in following order (to Wet Dock scenario): > AM_2016-02-19-none-1.mac > AM_2016-02-24-none-1.mac > IP_2016-02-25-none-1.mac > AM_2016-02-26-none-1.mac > 2016-05-04-none-1.mac > 2016-05-04-none-2.mac > 2016-05-04-none-3.mac > 6_update.221
	Once above updates applied run extractnets_batch.mac to generate networks by time period for input to ITAMS EMME model (place within relevant time period folder within Supply folder)			

Scenarios

Taking the demand and network updates described in this section plus highway travel times derived from the highway assignment component within ITAMS, the following scenarios were modelled;

- 2031 'Do-Minimum' with 1 Lane Gyratory
- 2031 'Do-Minimum' with 2 Lane Gyratory

Within the ITAMS demand and public transport models the impact of the gyratory removal is represented by changes in the highway travel times derived from the highway assignment component within ITAMS.

MODEL RESULTS

For each scenario, the effects of the updates on trip levels split by mode and time period are shown in Table 4.

Table 4 - Ipswich Core Strategy Trip Forecasts

	IPSWICH CORE STRATEGY				
Highway trips	AM 3hr	IP 6hr	PM 3hr	OP 12hr	Total
2031 1 Lane	127,896	205,292	138,441	94,679	566,309
2031 2 Lane	127,965	205,305	138,485	94,643	566,398
Bus trips	AM 3hr	IP 6hr	PM 3hr	OP 12hr	Total
2031 1 Lane	12,388	25,821	10,306	12,546	61,061
2031 2 Lane	12,409	25,829	10,316	12,544	61,098
Active mode trips	AM 3hr	IP 6hr	PM 3hr	OP 12hr	Total
2031 1 Lane	47,780	88,769	20,994	20,548	178,091
2031 2 Lane	47,769	88,757	20,991	20,545	178,063

As shown, the effect of removing a lane from the gyratory in 2031 has a small impact on overall trip levels.

Appendix D

GENERALISED COSTS

Generalised cost parameters 2031 – Pence per Minute (PPM)

	AM Peak	Interpeak	PM Peak	Off peak	Saturday
Car	30.16	32.91	28.05	27.89	27.34
Car Work	74.55	73.06	71.70	72.39	76.67
Car Commuting	18.43	18.31	18.11	18.14	18.25
Car Others	22.82	23.70	24.54	24.11	26.42
LGV	33.43	33.43	33.43	33.43	36.00
OGV1	34.37	34.37	34.37	34.37	34.37
OGV2	34.37	34.37	34.37	34.37	34.37
Bus	230.50	220.39	231.97	237.87	217.62

Generalised Cost Parameters 2031 – Pence per KM (PKM)

	AM Peak	Interpeak	PM Peak	Off peak	Saturday
Car	9.54	9.57	9.49	9.43	9.52
Car Work	12.30	12.30	12.30	12.30	12.30
Car Commuting	9.33	9.33	9.33	9.33	9.33
Car Others	9.33	9.33	9.33	9.33	9.33
LGV	14.22	14.22	14.22	14.22	14.22
OGV1	34.69	34.69	34.69	34.69	34.69
OGV2	70.22	70.22	70.22	70.22	70.22
Bus	82.02	82.02	82.02	82.02	82.02

Appendix E

CONVERGENCE STATISTICS

2008 BASE MODEL CONVERGENCE STATISTICS

2008 AM Convergence – Final 6 Iterations

Iteration	Delta	%Flow	%Gap
44	0.014	97.8	0.011
45	0.014	96.5	0.028
46	0.0118	97	0.028
47	0.0117	97.1	0.015
48	0.0146	97.9	0.028
49	0.0117	97.1	0.015

2008 PM Convergence – Final 6 Iterations

Iteration	Delta	%Flow	%Gap
13	0.0229	97.8	0.041
14	0.0366	96.3	0.02
15	0.0214	97.2	0.023
16	0.0248	98.3	0.017
17	0.0152	98.3	0.015
18	0.0137	97.7	0.022

FORECAST SINGLE LANE GYRATORY CONVERGENCE STATISTICS

2031 AM Single Lane Gyratory Convergence – Final 6 Iterations

Iteration	Delta	%Flow	%Gap
22	0.0346	97.8	0.035
23	0.0305	97	0.045
24	0.0326	97.4	0.042
25	0.0331	97.1	0.035
26	0.0276	97.9	0.038
27	0.0289	97.9	0.037

2031 PM Single Lane Gyratory Convergence – Final 6 Iterations

Iteration	Delta	%Flow	%Gap
37	0.019	97.8	0.049
38	0.043	96.6	0.027
39	0.0179	98.2	0.024
40	0.0188	97.4	0.038
41	0.0397	97.6	0.027
42	0.0175	97.9	0.033

FORECAST TWO LANE GYRATORY CONVERGENCE STATISTICS

2031 AM Two Lane Gyratory Convergence – Final 6 Iterations

Iteration	Delta	%Flow	%Gap
21	0.0316	96.6	0.037
22	0.0332	95.5	0.058
23	0.0334	97.2	0.038
24	0.0323	97.1	0.039
25	0.0264	97.5	0.033
26	0.0287	97.3	0.043

2031 PM Two Lane Gyratory Convergence – Final 6 Iterations

Iteration	Delta	%Flow	%Gap
39	0.0224	97.7	0.032
40	0.0233	96.6	0.027
41	0.017	98.5	0.029
42	0.0178	98.3	0.027
43	0.0324	97.4	0.028
44	0.0199	98.1	0.02

Appendix F

V/C RESULTS

2031 V/C junction performance – At least one peak V/C 100%+ (Single Lane Star Lane Gyratory)

NODE	JUNCTION	2008 AM V/C	AM V/C	AM DEMAND FLOW	2008 PM V/C	PM V/C	PM DEMAND FLOW
10001	A1156 / Civic Drive	46.54	100.97	603.23	49.37	90.41	779.2
10007	College Street / Star Lane / Greyfriars Road	101.16	102.72	506	76.32	101.41	716.29
10049	Bond Street / St Margaret's Street	93.4	100.28	746.14	50.51	63.26	846.85
10061	Grimwade Street / Fore Street 2	71.75	103.77	708.6	62.12	60.34	971.08
10108	Fore Street / Café Neptune junction	62.92	101.73	1156.78	46.49	94.75	1235.3
20014	A1214 / A137 / A1071 / Yarmouth Road	89.04	101.16	810.33	97.66	101.73	778.73
20015	Mile End(London Road) / Handford Road	98.22	101.24	542.21	79.99	89.9	518.47
20026	A1156 / Chevallier Street / Norwich Road	71.4	101.81	901.71	85.52	90.61	595.06
20027	A1156 / Chevallier Street / Norwich Road	41.12	68.61	1004.47	64.69	100.23	870.68
20047	A1214 / B1077	72.31	98.09	1047.92	94.7	100.27	1113.21
20048	A1214 / Tuddenham Road	88.03	101.74	1020.25	99.8	100.66	897.73
20077	Caudwell Hall Rd / Foxhall Rd	90.51	100.74	534.12	78.75	100.49	502.61
30002	A14 / A1156 northbound merge	81.34	108.02	839.68	71.2	93.32	2751.53
30044	A14 off slip / A1214	100.08	111.4	1064.96	99.27	107.71	1052.29
30045	A14 / A12 (Copdock) - A12 Entry	81.72	100.58	1847.58	58.52	70.43	1582.55
30047	A1214 / A14 on slip	100	100.04	585.22	99.86	100.98	1025.16
30049	A14 / A12 (Copdock) - Eastbound Merge	77.8	106.11	1713.84	69.44	103.86	1538.46
30076	A14 / A1189 - Westbound Merge	65.88	82.69	2643.64	81.21	101.53	1227.45
30098	A14 / A12 - A1156 Entry	66.49	103.03	884.74	64.4	84.63	808.53
30099	A14 / A1156 northbound offslip	55.34	105.77	500.86	54.1	77.65	374.84
30124	A1156 / Old Norwich Road	98.38	101.27	375.53	95.13	104.61	669.05
30148	A1214 / B1075 Ranelagh Road	73.57	96.81	246.98	101.38	103.07	686.33
30150	A1071 / Hadleigh Road	62.35	101.54	950.17	68.11	101.36	159.65
30214	Bridge Street / Dock Street / Vernon Street	92.74	103.67	547.31	45.22	76.31	699.15
30217	Wherstead Road / Hawes Street / Virginia Street Roundabout	30.88	102.95	589.69	28.79	100.95	601.52
30218	Wherstead Road (node)	70.97	100.78	1520.16	64.6	97.96	1462.39
30221	A137 (between A14 J56 & Wherstead Road)	75.59	100.53	1656.83	61.16	97.91	1599.71
30296	A1214 / A1189	65.16	101.61	1078.82	64.33	100.76	820.72
30301	Woodbridge Road / Beech Road	99.08	102.88	809.03	70.51	84.2	713.06
30303	A1214 / Bell Lane / Dr Watsons	98.81	101.25	861.02	97.22	97.87	861.35

	Lane						
30381	A1214 / Dickens Road	96.44	103.07	931.34	67.02	86.26	1279.09
30407	A1214 / A12 - Park and Ride node	101.23	100.53	1453.05	91.12	101.2	1111.59
30408	A1214/A12 - A12 SB Node	68.81	86.25	1462.79	96.49	101.43	1731.61
30785	Wherstead Road (node)	65.05	97.78	1409.99	68.16	100.62	1417.36
30794	A1214 / A14 on slip	31.2	105.05	585.15	35.1	105.21	558
30796	A14 / A12 (Copdock) - A14 WB Slip Node	69.27	90.5	1283.15	70.75	100.45	1470.59
30798	A12 / A14 Junction - A12 Northbound Offslip	46.66	101.01	1847.58	48.23	62.69	1112.98
30822	Hadleigh Road / Allenby Road	92.83	100.01	614.19	99.95	104.49	526.46
50051	A12 Node – Lane reduction	71.68	89.2	1544.77	98.4	100.26	1735.42
70043	Station Road / Wherstead Road	46.97	104.18	626	40.36	100.77	421.57
70048	Virginia Street / Wet Dock Crossing Western Side Junction	0.16	100.2	1244.34	0.12	75.59	1435.67

2031 V/C junction performance – At least one peak V/C 100%+ (Two Lane Star Lane Gyratory)

Node	Junction	2008 AM V/C	AM V/C	AM Demand Flow	2008 PM V/C	PM V/C	PM Demand Flow
10007	College Street / Star Lane / Greyfriars Road	101.16	103.27	379.82	76.32	101.29	686.68
10009	Bridge Street (slip road from College Street)	78.08	93.17	623.51	67.62	100.66	502.91
10018	Star Lane A1156 / Grimwade Street	88.15	93.36	839.92	100.7	101.41	769.42
20014	A1214 / A137 / A1071 / Yarmouth Road	89.04	100.65	799.6	97.66	101.66	779.49
20015	Mile End(London Road) / Handford Road	98.22	101.45	530.43	79.99	89.94	519.75
20026	A1156 / Chevallier Street / Norwich Road	71.4	100.9	867.04	85.52	91.18	594.28
20027	A1156 / Chevallier Street / Norwich Road	41.12	69.18	1008.39	64.69	100.2	884.73
20048	A1214 / Tuddenham Road	88.03	101.79	1007.42	99.8	100.65	900.13
20077	Caudwell Hall Rd / Foxhall Rd	90.51	99.98	540.53	78.75	100.09	515.26
30002	A14 / A1156 northbound merge	81.34	107.15	861.08	71.2	93.33	2746.34
30044	A14 off slip / A1214	100.08	110.18	1051.63	99.27	107.83	1051.93
30045	A14 / A12 (Copdock) - A12 Entry	81.72	100.59	1871.34	58.52	70.22	1583.89
30047	A1214 / A14 on slip	100	100.07	567.29	99.86	100.89	1026.04
30049	A14 / A12 (Copdock) - Eastbound Merge	77.8	108.14	1700.28	69.44	104.08	1540.35
30076	A14 / A1189 - Westbound Merge	65.88	77.68	2585.22	81.21	100.2	1266.31
30098	A14 / A12 - A1156 Entry	66.49	103.06	894.99	64.4	83.55	810.91
30099	A14 / A1156 northbound offslip	55.34	103.72	524.2	54.1	77.25	374.88
30124	A1156 / Old Norwich Road	98.38	103.52	392.17	95.13	104.56	664.15
30148	A1214 / B1075 Ranelagh Road	73.57	96.47	245.7	101.38	103.95	692.09
30150	A1071 / Hadleigh Road	62.35	101.07	955.12	68.11	101.77	160.47
30214	Bridge Street / Dock Street / Vernon Street	92.74	103.81	546.14	45.22	79.16	725.13
30218	Wherstead Road (node)	70.97	100.15	1508.69	64.6	97.79	1459.64
30253	A1156 / A1189 / Bucklesham Road	51.49	101.45	672.21	59.03	97.42	464.03
30296	A1214 / A1189	65.16	101.15	1130.17	64.33	100.75	824.05
30301	Woodbridge Road / Beech Road	99.08	102.97	809.75	70.51	85.14	720.89
30303	A1214 / Bell Lane / Dr Watsons Lane	98.81	101.29	861.11	97.22	97.87	861.2
30381	A1214 / Dickens Road	96.44	103.13	931.56	67.02	86.8	1284.05
30407	A1214 / A12 - Park and Ride node	101.23	100.46	1451.75	91.12	101.2	1110.7
30408	A1214/A12 - A12 SB Node	68.81	84.76	1437.4	96.49	101.54	1729.51
30785	Wherstead Road (node)	65.05	100.48	1423.89	68.16	100.52	1414.02
30794	A1214 / A14 on slip	31.2	105.31	567.18	35.1	105.28	558.24
30796	A14 / A12 (Copdock) - A14 WB	69.27	90.76	1302.64	70.75	100.45	1470.19

	Slip Node						
30798	A12 / A14 Junction - A12 Northbound Offslip	46.66	101.14	1871.61	48.23	62.7	1112.58
30822	Hadleigh Road / Allenby Road	92.83	100.29	613.2	99.95	103.82	522.93
70043	Station Road / Wherstead Road	46.97	105.05	626.24	40.36	101.65	381.75

2031 V/C junction performance – At least one peak V/C 90 – 99% (Single Lane Star Lane Gyratory)

NODE	JUNCTION	2008 AM V/C	AM V/C	AM DEMAND FLOW	2008 PM V/C	PM V/C	PM DEMAND FLOW
10001	A1156 / Civic Drive	46.54	100.97	603.23	49.37	90.41	779.2
10016	A1156 / Salthouse St / Fore Street Junction	57.98	82.49	902.23	45.85	93.76	1065.36
10018	Star Lane A1156 / Grimwade Street	88.15	83.1	750.14	100.7	99.71	756.3
10020	A1156 St Margaret's Street / Helen's Street B1075	81.14	95.14	618.7	92.16	96.4	623.47
10030	A1156 / High Street / Museum Street	84.6	94.19	656.7	83.57	99.23	595.69
10108	Fore Street / Café Neptune junction	62.92	101.73	1156.78	46.49	94.75	1235.3
20023	A1156 / B1067	64.39	84.79	824.17	82.48	97.98	685.8
20026	A1156 / Chevallier Street / Norwich Road	71.4	101.81	901.71	85.52	90.61	595.06
20044	A1214 / Henley Road	92.47	96.37	681.5	93.65	91.74	302.92
20047	A1214 / B1077	72.31	98.09	1047.92	94.7	100.27	1113.21
20057	Woodbridge Rd / Albion Hill / Belvedere Rd	50.92	82.52	311.7	74.36	94.65	580.41
30002	A14 / A1156 northbound merge	81.34	108.02	839.68	71.2	93.32	2751.53
30013	A1156 / A14	72.15	86.8	3081.18	69.46	90.48	3062.63
30032	A14 / Sproughton Road - SB Merge	70.43	94.84	3239.73	72.03	94.34	3327.47
30060	A14 / A137 - Westbound Merge	63.95	86.76	2656.21	68.24	98.4	2957.64
30063	A14 / A137 - Eastbound Merge	72.25	96.57	2868.03	77.72	90.54	2874.49
30110	A12 / Barrack Square / Eagle Way	46.68	91.27	1860.23	64.61	79.8	127.47
30114	A12 / A1214 - A12 NB Entry	97.26	95.14	1218.79	91.94	99.59	665.36
30135	B1113 / Lower Street / High Street	28.19	91.72	552.55	34.16	76.65	530.19
30136	Ashcroft Road / Norwich Road	79.92	74.86	592.73	96.03	92.55	730.2
30193	Belstead Road / Willoughby Road	52.17	97.05	805.23	27.13	71.1	396.87
30218	Wherstead Road (node)	70.97	100.78	1520.16	64.6	97.96	1462.39
30221	A137 (between A14 J56 & Wherstead Road)	75.59	100.53	1656.83	61.16	97.91	1599.71
30253	A1156 / A1189 / Bucklesham Road	51.49	94.05	744.47	59.03	98.52	461.9
30275	Heath Road / Foxhall Road	67.51	99.34	628.05	65.3	84.26	672.98
30303	A1214 / Bell Lane / Dr Watsons Lane	98.81	101.25	861.02	97.22	97.87	861.35
30468	Hawthorn Drive / Aster Road Roundabout	43.93	59.48	592.47	48.38	93.39	886.36
30785	Wherstead Road (node)	65.05	97.78	1409.99	68.16	100.62	1417.36
30796	A14 / A12 (Copdock) - A14 WB	69.27	90.5	1283.15	70.75	100.45	1470.59

	Slip Node						
50013	B1113 / A14 on slip	78.22	100.89	250.11	69.36	93.66	3476.38
50052	A12 west of Woodbridge	90.83	97.19	1715.13	66.69	78.85	1391.18
70309	Bixley Road (node)	74.54	92.27	1325.75	71.63	89.26	1292.57
70315	Hawes Street Ped Crossing	68.7	97.41	1353.76	64.97	99.09	1339.22

2031 V/C junction performance – At least one peak V/C 90 – 99% (Two Lane Star Lane Gyratory)

Node	Junction	2008 AM V/C	AM V/C	AM Demand Flow	2008 PM V/C	PM V/C	PM Demand Flow
10001	A1156 / Civic Drive	46.54	100.97	603.23	49.37	90.41	779.2
10016	A1156 / Salthouse St / Fore Street Junction	57.98	82.49	902.23	45.85	93.76	1065.36
10018	Star Lane A1156 / Grimwade Street	88.15	83.1	750.14	100.7	99.71	756.3
10020	A1156 St Margaret's Street / Helen's Street B1075	81.14	95.14	618.7	92.16	96.4	623.47
10030	A1156 / High Street / Museum Street	84.6	94.19	656.7	83.57	99.23	595.69
10108	Fore Street / Café Neptune junction	62.92	101.73	1156.78	46.49	94.75	1235.3
20023	A1156 / B1067	64.39	84.79	824.17	82.48	97.98	685.8
20026	A1156 / Chevallier Street / Norwich Road	71.4	101.81	901.71	85.52	90.61	595.06
20044	A1214 / Henley Road	92.47	96.37	681.5	93.65	91.74	302.92
20047	A1214 / B1077	72.31	98.09	1047.92	94.7	100.27	1113.21
20057	Woodbridge Rd / Albion Hill / Belvedere Rd	50.92	82.52	311.7	74.36	94.65	580.41
30002	A14 / A1156 northbound merge	81.34	108.02	839.68	71.2	93.32	2751.53
30013	A1156 / A14	72.15	86.8	3081.18	69.46	90.48	3062.63
30032	A14 / Sproughton Road - SB Merge	70.43	94.84	3239.73	72.03	94.34	3327.47
30060	A14 / A137 - Westbound Merge	63.95	86.76	2656.21	68.24	98.4	2957.64
30063	A14 / A137 - Eastbound Merge	72.25	96.57	2868.03	77.72	90.54	2874.49
30110	A12 / Barrack Square / Eagle Way	46.68	91.27	1860.23	64.61	79.8	127.47
30114	A12 / A1214 - A12 NB Entry	97.26	95.14	1218.79	91.94	99.59	665.36
30135	B1113 / Lower Street / High Street	28.19	91.72	552.55	34.16	76.65	530.19
30136	Ashcroft Road / Norwich Road	79.92	74.86	592.73	96.03	92.55	730.2
30193	Belstead Road / Willoughby Road	52.17	97.05	805.23	27.13	71.1	396.87
30218	Wherstead Road (node)	70.97	100.78	1520.16	64.6	97.96	1462.39
30221	A137 (between A14 J56 & Wherstead Road)	75.59	100.53	1656.83	61.16	97.91	1599.71
30253	A1156 / A1189 / Bucklesham Road	51.49	94.05	744.47	59.03	98.52	461.9
30275	Heath Road / Foxhall Road	67.51	99.34	628.05	65.3	84.26	672.98
30303	A1214 / Bell Lane / Dr Watsons Lane	98.81	101.25	861.02	97.22	97.87	861.35
30468	Hawthorn Drive / Aster Road Roundabout	43.93	59.48	592.47	48.38	93.39	886.36
30785	Wherstead Road (node)	65.05	97.78	1409.99	68.16	100.62	1417.36
30796	A14 / A12 (Copdock) - A14 WB Slip Node	69.27	90.5	1283.15	70.75	100.45	1470.59

50013	B1113 / A14 on slip	78.22	100.89	250.11	69.36	93.66	3476.38
50052	A12 west of Woodbridge	90.83	97.19	1715.13	66.69	78.85	1391.18
70309	Bixley Road (node)	74.54	92.27	1325.75	71.63	89.26	1292.57
70315	Hawes Street Ped Crossing	68.7	97.41	1353.76	64.97	99.09	1339.22

Appendix G

V/C PLOTS

Date Modified: 10/05/2016

Drawn By: UKDJT007

File: Q:\WSP_UK\WSP_D\Hertford\70007052 - Ipswich Core Strategy Transport Modelling\160509 VC Plots.mxd

Key

- 2031 AM + PM VC 90% - 99% Single Lane Gyratory
- SATURN Network

akenham
Claydon
Grundisbu
WOODBRIDGE
Bramford
20044
Rushmere St Andrew
30114
Martlesham
KESGRAVE
30032
Sproughton
40630
10026
IPSWICH
Martlesham Heath
Brightwell Heath
70315
30253
30063
River Orwell
A12
A14

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0 0.25 0.5 1 1.5 2 Kilometres

WSP | PARSONS BRINCKERHOFF

TITLE:

IPSWICH CORE STRATEGY 2031
BOTH PEAKS VC 90 - 99%
FLOW >= 500 IN AT LEAST ONE PEAK
SINGLE LANE GYRATORY

FIGURE No:

FIGURE 1

Date Modified: 10/05/2016

Drawn By: UKDJT007

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Key

- 2031 AM + PM VC 90% - 99% Two Lane Gyratory
- SATURN Network

akenham
Claydon
Grundisbu
WOODBRIDGE
Bramford
Sproughton
IPSWICH
Rushmere St Andrew
KESGRAVE
Martlesham
Martlesham Heath
Brightwell Heath
River Orwell
A12
A14
20044
20047
30032
30114
20069
70315
30221
30063

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0 0.25 0.5 1 1.5 2 Kilometres

WSP | PARSONS BRINCKERHOFF

TITLE:

IPSWICH CORE STRATEGY 2031
BOTH PEAKS VC 90 - 99%
FLOW >= 500 IN AT LEAST ONE PEAK
TWO LANE GYRATORY

FIGURE No:

FIGURE 2

Date Modified: 10/05/2016

Drawn By: UKDJT007

File: Q:\WSP_UK\WSP_D\Hertford\70007052 - Ipswich Core Strategy Transport Modelling\160509 VC Plots.mxd

Key

- 2031 AM + PM VC OVER 100% Single Lane Gyratory
- SATURN Network

akenham
Claydon
Grundisbu
WOODBRIDGE
30124
Bramford
20048
Rushmere St Andrew
30407
Martlesham
KESGRAVE
30296
Sproughton
30322
20011
IPSWICH
10007
20077
Martlesham Heath
Brightwell Heath
30150
70043
30217
30047
30794
30044
30049
River Orwell
A12
A14

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0 0.25 0.5 1 1.5 2 Kilometres

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TITLE:

IPSWICH CORE STRATEGY 2031
BOTH PEAKS VC OVER 100%
FLOW >= 500 IN AT LEAST ONE PEAK
SINGLE LANE GYRATORY

FIGURE No:

FIGURE 3

Date Modified: 10/05/2016

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Key

- 2031 AM + PM VC OVER 100% Two Lane Gyratory
- SATURN Network

akenham
Claydon
Grundisbu
WOODBRIDGE
30124
Bramford
20048
Rushmere St Andrew
30407
Martlesham
KESGRAVE
30296
Sproughton
30322
20011
IPSWICH
10007
Martlesham Heath
Brightwell Heath
30150
70043
30047
30794
30044
30049
River Orwell
A12
A14

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0 0.25 0.5 1 1.5 2 Kilometres

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TITLE:

IPSWICH CORE STRATEGY 2031
BOTH PEAKS VC OVER 100%
FLOW >= 500 IN AT LEAST ONE PEAK
TWO LANE GYRATORY

FIGURE No:

FIGURE 4

Date Modified: 10/05/2016

Drawn By: UKDJT007

File: Q:\WSP_UK\WSP_D\Hertford\70007052 - Ipswich Core Strategy Transport Modelling\160509 VC Plots.mxd

Key

- 2031 AM OR PM VC 90% - 99% Single Lane Gyratory
- SATURN Network

akenham

Grundisbu

50013

50052

WOODBRIDGE

30002

30013

30136

20044

20047

Bramford

Rushmere St Andrew

30303

30114

Martlesham

KESGRAVE

20026

30032

20023

20057

30110

30135

Sproughton

10007

10030

10026

Martlesham Heath

IPSWICH

70018

30108

10016

Brightwell Heath

30275

30193

70315

30218

30468

30253

70309

30796

30221

30060

30063

River Orwell

A12

A14

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0 0.25 0.5 1 1.5 2 Kilometres

WSP | PARSONS BRINCKERHOFF

TITLE:

IPSWICH CORE STRATEGY 2031
AT LEAST ONE PEAK VC 90 - 99%
FLOW >= 500
SINGLE LANE GYRATORY

FIGURE No:

FIGURE 5

Date Modified: 10/05/2016

Drawn By: UKDJT007

File: Q:\WSP_UK\WSP_D\Hertford\70007052 - Ipswich Core Strategy Transport Modelling\160509 VC Plots.mxd

Key

- 2031 AM OR PM VC 90% - 99% Two Lane Gyratory
- SATURN Network

akenham
Grundisbu
50013
50052
WOODBRIDGE
50051
30002
30013
30136
20044
20047
Bramford
Rushmere St Andrew
30303
30114
Martlesham
KESGRAVE
20026
30032
20023
20057
30135
Sproughton
10007
10030
10049
20069
10420
Martlesham Heath
IPSWICH
10018
20072
20077
Brightwell Heath
30275
10009
30198
70315
30468
70218
70309
30240
30796
30221
30060
30063
River Orwell
A12
A14

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0 0.25 0.5 1 1.5 2 Kilometres

WSP | PARSONS BRINCKERHOFF

TITLE:

IPSWICH CORE STRATEGY 2031
AT LEAST ONE PEAK VC 90 - 99%
FLOW >= 500
TWO LANE GYRATORY

FIGURE No:

FIGURE 6

Date Modified: 10/05/2016

Drawn By: UKDJT007

File: Q:\WSP_UK\WSP_D\Hertford\70007052 - Ipswich Core Strategy Transport Modelling\160509 VC Plots.mxd

Key

- 2031 AM OR PM VC OVER 100% Single Lane gyratory
- SATURN Network

Claydon

Grundisb

WOODBRIDGE

50051

30002

30124

Bramford

20047

20048

Rushmere St Andrew

30303

30407

30408

Martlesham

KESGRAVE

30301

30296

20026

20027

Sproughton

10091

30322

20015

30148

20011

30381

IPSWICH

10049

Martlesham Heath

10008

10061

10108

20077

Brightwell Heath

30214

30150

70043

70048

30045

30794

30798

30796

30649

30221

River Orwell

30076

30099

20099

A12

A14

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0 0.25 0.5 1 1.5 2 Kilometres

WSP | PARSONS BRINCKERHOFF

TITLE:

IPSWICH CORE STRATEGY 2031
AT LEAST ONE PEAK VC OVER 100%
FLOW >= 500
SINGLE LANE GYRATORY

FIGURE No:

FIGURE 7

Date Modified: 10/05/2016

Drawn By: UKDJT007

File: Q:\WSP_UK\WSP_D\Hertford\70007052 - Ipswich Core Strategy Transport Modelling\160509 VC Plots.mxd

Key

- 2031 AM OR PM VC OVER 100% Two Lane Gyratory
- SATURN Network

akenham
Claydon
Grundisbu
WOODBRIDGE
Bramford
Sproughton
Rushmere St Andrew
KESGRAVE
Martlesham
Martlesham Heath
Brightwell Heath
IPSWICH
River Orwell
A12
A14

30002
30124
20048
20026
20027
30322
20015
20011
30148
30381
10018
10009
10008
30214
20077
30150
70043
30218
30253
30045
30794
30798
30796
30649
30296
30301
30303
30407
30408
30099
30076

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0 0.25 0.5 1 1.5 2 Kilometres

WSP | PARSONS BRINCKERHOFF

TITLE:

IPSWICH CORE STRATEGY 2031
AT LEAST ONE PEAK VC OVER 100%
FLOW >= 500
TWO LANE GYRATORY

FIGURE No:

FIGURE 8