

# Wirral Development Model

Assessment of Wirral Core Strategy Transport Impacts

August 2012 Wirral Council





# Wirral Development Model

Assessment of Wirral Core Strategy Transport Impacts

August 2012

Wirral Council

Wirral Council Technical Services DepartmentCheshire LinesCanning StreetBirkenheadWirral, CH41 1ND



# Issue and revision record

<b>Revision</b> 001 00A	<b>Date</b> 13 June 2012	<b>Originator</b> IC	<b>Checker</b> NG	Approver	<b>Description</b> 1 <sup>st</sup> Draft
001 00B	20 June 2012	IC	NG	HF	Submission
001 00C	25 July 2012	IC	NG	HG	Updated for Clients Comments
001 00D	29 August 2012	IC	NG	EM	Updated for final client comments

This document is issued for the party which commissioned it and for specific purposes connected with the above-captioned project only. It should not be relied upon by any other party or used for any other purpose. We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties

This document contains confidential information and proprietary intellectual property. It should not be shown to other parties without consent from us and from the party which commissioned it.



# Content

#### **Chapter Title**

Page

Executi	ive Summary	i
1.	Introduction	1
1.1	Outline	1
1.2	Report Structure	1
2.	Modelling Components	2
2.1	Liverpool City Region Transport Model	2
2.2	Forecasting Travel Demand	9
2.3	Interface with East Wirral Saturn Model	11
3.	Developments	12
3.1	Introduction	12
3.2	Scenarios	12
3.3	Development Data	12
3.4	Non-Wirral Zones	13
3.5	Aggregation of Development Data to LCRTM zone	14
3.6	Seeding of Development Trips/Distribution	14
3.7	Forecast Networks	14
4.	Assessment	16
4.1	Introduction	16
4.2	Mode Share	16
4.3	Highway Demand	17
4.4	Vehicle Kilometres	18
4.5	Average Trip Length	19
4.6	Journey Times	20
4.7	Assignment Analysis	23
4.8	Analysis of the Do Minimum	23
4.9	Flow plots	23
4.10	Volume over Capacity Ratios	24
4.11	Change in Link Travel Times	24
5.	Conclusions	25

# Appendices

Appendix A.	Housing Data	28
Appendix B.	Employment Forecast	34
Appendix C.	Development Maps	40
Appendix D.	Key to Figures	47
Appendix E.	Do Minimum Analysis	50
Appendix F.	Flow Changes	53
Appendix G.	Volume over Capacity Ratio	58
Appendix H.	Link Travel Time	63

27



Appendix I. Detailed LCRTM Assignment Outputs \_\_\_\_\_\_68



# **Executive Summary**

The impact of Wirral's Core Strategy on the highway network in the district has been assessed using the Liverpool City Region Transport Model (LCRTM). The analysis has focused on providing an indication on where the pressures on the local road network are likely to be the greatest and to judge the extent of this impact on the wider road network across the District.

Development scenarios representing Wirral Council's projected Do Minimum and Core Strategy have been compared at 2014 and 2024. The impact of the Core Strategy over and above the impact of the Do Minimum has been analysed.

Based on journeys that have at least one end of their trip within the Wirral, the main findings from analyses of the model outputs are as follows:

- The modal share of all journeys by car and public transport is not predicted to be affected.
- In the AM (PM) peak, the Core Strategy leads to around a 1.6% (1.6%) increase in all highway trips by 2014 and 4.4% (3.9%) growth by 2024. The main contributor to this growth is trips to work.
- Small increases in total vehicle-kilometres travelled are predicted, arising from the increased level of traffic in the Core Strategy. At 2024, LCRTM predicts a reduction of approximately 2% in the morning peak and less than 1% in the evening peak in total vehicle kilometres.
- LCRTM predicts a small decrease in the average trip lengths. At 2024, LCRTM shows a decrease of approximately 2% in average trip lengths in the AM peak, and 3% in the PM peak. This suggests that the Core Strategy, whilst adding trips to the road network in Wirral, is not creating longer trips.

In terms of the impact on the highway network:

- The Do Minimum scenario leads to many roads having a volume over capacity in excess of 85% by 2024, suggesting that even without the Core Strategy there will be areas of the network, particularly focused around the East and West Float dock, which are likely to require measures to improve the performance of the highway.
- The additional impact on the performance of the highway network with the Core Strategy developments is barely noticeable in 2014.
- By 2024, the impact of the Core Strategy is more pronounced and is highest in the area around the East and West Float, and on sections of the main routes into and out of this area. The impact is not shown to be District-wide and the model indicates that traffic growth in either of the Mersey tunnels is unlikely to be significant.
- Relatively few of the roads identified as "*hot-spots*" in terms of impact will see a significant deterioration in their available capacity by 2024, compared to the Do Minimum. However it is likely that improvements to junctions on these roads will need



to be considered so that they continue providing a satisfactory level of service. A more detailed modelling exercise will be required to establish the effect of the improvement measures at junctions.

From the modelling work undertaken, it can be concluded that the impact of the Core Strategy on the performance of the road network will be, to a large extent, spatially limited within the area around the East and West Floats. These impacts can however be mitigated with targeted junction improvements – these would be in addition to those required to mitigate against some of the impacts of the Do Minimum scenario – and combined with demand management measures such as enhancements to public transport services.

In the context of the incremental impact of the Core Strategy over the Do Minimum, the evidence from the modelling suggests that the Core Strategy is deliverable. More detailed work, using the East Wirral SATURN model is recommended to establish the level and nature of the highway improvements required in the area shown in the figure below, whilst enhancements to the public transport network could be modelled in LCRTM. It is expected that developers would contribute toward the cost of such mitigation measures as part of their development proposals in this area.

### Wirral Development Model Assessment of Wirral Core Strategy Transport Impacts





Recommended area for detailed modelling of Core Strategy impacts



# 1. Introduction

# 1.1 Outline

Mott MacDonald has been commissioned by Wirral Council to assess the transport impacts of development proposals within their Core Strategy. In undertaking this work, Mott MacDonald has utilised the Liverpool City Region Transport Model (LCRTM), which has been set up to run and compare two distinct development scenarios:

i) A **Do Minimum** comprising historic trends rolled forward plus consented development, or development that is fairly certain to go ahead, and

ii) A **Do Something** comprising the development scenario currently set out in the Core Strategy plus key development schemes (including those that are fairly certain to go ahead) and other potential schemes that the Council wishes to see come forward during the Core Strategy Plan period.

LCRTM has been used to provide an indication of where congestion and delay on the highway network is likely to occur (referred to as hot spots as a result of implementing the Core Strategy developments.

### 1.2 Report Structure

Following this introduction, the report is split into four further chapters:

- Chapter 2 provides information on the structure of LCRTM, what it was designed to do and its component parts. The forecasting process is also described in terms of how future year travel demand is estimated and the inputs that are required for this. The interface between LCRTM to a more detailed SATURN model of Wirral is also described;
- Chapter 3 summaries the forecast development scenarios and how these have been accounted for in the model set up;
- Chapter 4 contains a summary and explanation of the model results; and
- Chapter 5 concludes the report and sets out the next steps.



# 2. Modelling Components

# 2.1 Liverpool City Region Transport Model

The Liverpool City Region Transport Model (LCRTM) is a multi-modal transport model, comprising a linkbased highway model, a public transport model and a variable demand model, and is the primary assessment tool for testing various transport intervention measures in the City Region.

The geographical scope for the model includes the Liverpool City Region as the main study area - which covers areas of West Cheshire, West Lancashire and Warrington, and a buffer area beyond this extending further into Lancashire and areas of Greater Manchester and North Wales, as shown in **Figure 2.1**.



Figure 2.1: Geographical scope of LCRTM

Source: LCRTM Highway Model Local Model Validation Report - December 2009



LCRTM has a base year of 2008 – i.e. it is representative of travel demand and conditions in 2008. The model has been used for appraising measures within Merseyside's Third Local Transport Plan (LTP3), which became active in April 2011. Further work was completed in August 2011 to incorporate new traffic data into the highway model, although the model retained its 2008 base year. Since then, prominent applications of the model have included supporting Merseyside's Local Sustainable Transport Fund (LSTF) bid and more recently associated bidding for the Better Bus Area Fund (BBAF), which secured funding of £20M and £4M from Department for Transport (DfT) for the region respectively.

#### 2.1.1 Objectives

LCRTM has been designed to address the following objectives:

- Produce a long term forecast of growth in demand for travel in the region, which will reflect changes to land use, demographics, employment and the economy;
- Forecast the impacts of growth and changes in demand for travel on the existing highways and public transport networks.
- Forecast the impacts of specific major regeneration projects and major land use developments on the transport system in the Liverpool City Region;
- Forecast the impacts of increased congestion on the local economy and quality of life;
- Examine an array of measures and interventions that could be deployed to mitigate traffic/travel growth impacts.

#### 2.1.2 Structure

LCRTM follows the Department for Transport (DfT) guidance WebTAG in respect of its components and structure. The model system operates within CUBE software, using VOYAGER applications and bespoke scripting of processes such as the assignment methodology and the variable demand model.

The general structure of LCRTM is explained in **Figure 2.2**, illustrating the hierarchy of travel choices that fall between trip generation and assignment. At each level in the hierarchy the travel choice is dependent upon the change in cost of travel from the base year to the forecast year. The highway and public transport models, which are the final stage in the model are concerned with the routing of vehicles and passengers throughout the transport system, whilst the demand model deals with the traveller choices in terms mode choice (*how to travel*), time period choice (*when to travel*) and distribution (*where to travel*).





Figure 2.2: Overall LCRTM 5-Stage Model Structure

#### 2.1.3 Stage 1: Trip Generation

This is the first stage in the model structure and is a measure of the total demand for travel across all destinations, time periods and modes. Trip generation is split by journey purpose, for example journeys to work (commuting), journeys in the course of work (employers business) and other (such as shopping, education and leisure related trips). A further discussion on the mechanism used to forecast the total demand for travel is provided in **Section 2.2**.

#### 2.1.4 Stage 2: Mode Choice

Subsequent to trip generation the total travel demand is then split across three travel modes: public transport (comprising of bus and rail), car and slow modes (comprising walk and cycle).



#### 2.1.5 Stage 3: Time Period Choice (Macro)

The model has four discrete time periods: the morning peak period (07:00:10:00); interpeak (10:00-16:00), evening peak period (16:00-19:00) and the off peak (19:00-07:00).

#### 2.1.6 Stage 4: Distribution

Trips by purpose, mode and time period are then distributed to destinations within the model.

#### 2.1.7 Stage 5: Departure Time Choice

Within the morning peak period, a further division of the travel demand occurs, with the model splitting the number of trips into a pre-peak, peak, and post-peak hour.

#### 2.1.8 Assignment

This concerns the routing of passengers on the public transport network, i.e. which bus and rail services they use to connect their trip origin and destination. For car users, it is the choice of roads that connect each end of their journey. In both cases, route choice is based on travellers using the cheapest cost route, based on factors such as fares, waiting times, travel times and fuel costs.

In terms of the highway model, three vehicle classes are assigned: cars, light goods vehicles (LGV) and other goods vehicles (OGV). The car vehicle class is further sub-divided into three journey purposes: commuting, employers business and other. Only the peak hours (08:00-09:00 and 17:00-18:00) and the average interpeak (between 10:00-16:00) are subject to assignment.

#### 2.1.9 Base year Travel Demand

As stated LCRTM currently has a base year of 2008. The total demand for travel in 2008, and the respective origin and destination of trips in the City Region has been developed using a number of sources, including:

- From historical roadside interview data collected across the region, including Wirral;
- From information derived from Merseyside Travel Survey (HTS) on household trip rates; and
- Land use indicators, such as statistics on total employment, retail employment and educational places.

An update to the LCRTM highway model was undertaken in 2011 during which the roadside interview (RSI) data collected in 2009 in Wirral (for locations refer to **Figure 2.3**) and Liverpool cordons (**Figure 2.4**) were incorporated into the model, thus improving the representation of trips in these areas of the model. The base year of the model was left unchanged.

During this update, roadside interview data from surveys collected on the western side of Ellesmere Port town centre were also included to improve the representation of highway trips from this area of the model into Wirral.





Figure 2.3: Wirral RSI Cordons - 2009

Source: 294188-R01-LCR-LMVR\_Addendum\_Report\_RevB\_NGUpdated.doc



Figure 2.4: Liverpool RSI cordons - 2009



Source: 294188-R01-LCR-LMVR\_Addendum\_Report\_RevB\_NGUpdated.doc

## 2.1.10 LCRTM Highway Network and zoning Wirral

LCRTM comprises of **459** model zones, **46** of which are located within Wirral's administrative boundary as shown in **Figure 2.5**. The zoning system has been developed based on Census Output Area boundaries, which have then been aggregated.







Source: LCRTM\_Zone\_System-Wirral\_District.pdf

The coverage of the highway network in Wirral and adjacent areas is shown in **Figure 2.6** (where the black lines show the links included in the model). All motorways, A-roads, B-roads and significant C-roads are included, thus providing a good coverage of the major routes between trip origins and destinations in the district.

The LCRTM highway network is link based and the representation of delay to highway vehicles is undertaken by the use of speed flow curves. There is no explicit junction modelling in the current version of LCRTM, hence the analysis of impacts on junctions cannot be assessed. More detailed modelling will be available via LCRTM's interface with the East Wirral Traffic Model (discussed further in **Section 2.3**)





Figure 2.6: Extent of the highway network coded in LCRTM in Wirral

Source: LCRTM\_Zone\_System-Wirral\_District.pdf

## 2.2 Forecasting Travel Demand

Changes in travel demand arise from:

- Population growth
  - Housing development
  - Housing occupancies
- Location and volume of employment, including strategic development sites
  - Regeneration and economic activity
- Changes in car ownership

These features are all represented in LCRTM's approach to forecasting future travel demand.

#### 2.2.1 Forecast years

The default forecast years for LCRTM are 2014 and 2024 and have been retained for the current study.

#### 2.2.2 Trip Production Forecasts

Forecasts of trip productions are split into three broad categories:



- The number of home based trips: The quantum of home based trips are based on the changes in the number of households taking into account Government forecasts in terms of compositions of households and car ownership, which are then combined with the trip generation rates derived from the Merseyside Household Travel Survey (HTS).
- Non-home based trips: Non home based trips, for example a trip made from a place of work on business, are estimated based on information in the HTS on the propensity for making a non-home based trip, which is then applied to the non-home end of a home based trip.
- **Freight**: the growth in freight is based on the growth in total employment.

#### 2.2.3 Trip Attraction Forecasts

Within LCRTM, attraction forecasts are based on future year estimates of:

- Total employment;
- Retail employment;
- Pupils; and
- Population.

These estimates are undertaken at zonal level and then used to distribute the trip productions prior to the demand model being run. For example, home based commuting trips are distributed according to the location and scale of total employment, whilst trips associated with education and shopping are distributed according to Government forecasts on pupil numbers and retail employment respectively.

#### 2.2.4 Constraint to Trip Productions

It is important to note that forecasting within LCRTM is primarily a home-based forecast, recognising the fundamental building block of trip generation is the household unit. Whilst databases such as TRICS are often used to develop estimates of the trips into and out of development sites, the default approach taken in LCRTM is to **estimate the total number of trips generated by the household unit, and then distribute these across the various trip attractions**. Hence, the number of journeys to work in the model, for example, is governed not by the number of employment places, but by the number of journey to work trips created by all the households. The number of employment places is only used as a weight to distribute the commuting trips across the modelled zones. For certain development sites, however, the default mechanism has been overwritten to better represent the level of trip making presented in current transport assessments.

#### 2.2.5 Outputs

The forecasting of trips is undertaken in a separate LCRTM module, contained within an Access Database: the External Forecasting Model (EFM). The outputs from EFM are future year trip matrices that are based on travel costs remaining unchanged from those in the base year – these are termed *reference case matrices*.

When assigned to the transport network the reference case matrices result in changes in travel costs (through increased congestion from increased traffic levels) compared to the base year model, and the response to these cost changes in terms of the mode, destination and time period choices, are determined within the demand model. Hence, the output from the demand model are a new set assignment matrices that reflect the changes in cost of travel as a result of future increases in travel demand and can be used to estimate the impact on the transport network of the developments.



# 2.3 Interface with East Wirral Saturn Model

A SATURN model has also been developed for East Wirral (the East Wirral Traffic Model – EWTM), which facilitates a more detailed analysis of highway impacts in Wirral and includes junction simulation modelling. The zone system of this model has been developed to sit inside the LCRTM zones, with between four and six EWTM zones to a single LCRTM zone. A mechanism has been developed that allows traffic growth forecasts from LCRTM to be applied to EWTM.

Whilst the current study has concentrated on looking at the higher level impacts (i.e. within LCRTM), EWTM will be used to develop infrastructure planning work necessary to support the Core Strategy. As outlined in the next chapter, development assumptions for both the Do Minimum and Core Strategy scenarios have been collated using the EWTM zone boundaries as identified in **Figure 2.7** and then converted to the LCRTM zoning system.



Figure 2.7: East Wirral Transport Model zone boundaries

Source: LCRTM\_&\_EWTM\_Mapinfo\_Layers\_for\_issue\_010312\LCRTM\_Network&Zones\_Wirral\_Coverage.pdf



# 3. Developments

# 3.1 Introduction

In this chapter the development scenarios that have been tested in LCRTM are described.

### 3.2 Scenarios

Two development scenarios have been modelled in LCRTM, namely:

- 1. The **Do Minimum** (i.e. historic trends rolled forward, which includes consented key development schemes); and
- 2. The **Do Something** (i.e. the Core Strategy, which includes both consented and potential key development schemes).

Within the Do Something the following key schemes, as described by Wirral Council, are included:

Key Scheme
Asda Birkenhead
Woodside
Hind Street
Wirral Waters
Cammell Lairds
International Trade Centre
Bidston Dock
New Brighton regeneration
Golf Resort
Eastham Dock Estate
Wirral International Business Park
Levers

## 3.3 Development Data

In view of the forecasting mechanism utilised in LCRTM, Wirral Council provided bespoke projections in terms of the predicted growth in housing, total employment and retail employment within Wirral. The information was provided at East Wirral Transport Model zone level and is summarised in **Tables 3.1** and **3.2** below.

In terms of the development projections for the Core Strategy, some of the growth can be attributed to the key schemes highlighted above, whilst some will relate to a number of smaller or medium schemes, or simply an accumulation of available land that is expected to come forward in the plan period.

A copy of the actual data provided by Wirral is included in **Appendix A and Appendix B**. Mapping showing the size and location of the new development is provided in **Appendix C**.

**Table 3.3** shows that by 2024, the Core Strategy provides for an additional 13,090 housing units, over and above the base 2008 case, with nearly 35,000 new employment opportunities.



#### Table 3.1: Forecasting Inputs: growth 2008-2014

Scenario	Housing	Employment (all)	Employment (Retail
Do Minimum	2,400	6,497	886
Do Something	4,491	8,911	949

Source: 2012 03 30 Transport model info FOR SENDING.xls [provided by Wirral Council]

#### Table 3.2: Forecasting Inputs: growth 2014-2024

Scenario	Housing	Employment (all)	Employment (Retail
Do Minimum	4,000	9,712	609
Do Something	8,599	25,978	1,292

Source: 2012 03 30 Transport model info FOR SENDING.xls [provided by Wirral Council]

#### Table 3.3: Forecasting Inputs: growth 2008-2024

Scenario	Housing	Employment (all)	Employment (Retail
Do Minimum	6,600	16,209	1,495
Do Something	13,090	34,889	2,212

Source: 2012 03 30 Transport model info FOR SENDING.xls [provided by Wirral Council]

#### **3.4 Non-Wirral Zones**

With the exception of Cheshire West and Chester, the household and employment growth used in the remainder of the City Region is consistent to that adopted in the version of LCRTM used to appraise LTP3. Hence, for employment, projections and major employment site are consistent with the "Aspirational" forecast for the City Region made by Cambridge Econometrics/PION in 2009 (on behalf of the Merseyside Partnership)<sup>1</sup>.

The LTP3 forecast included the addition of major employment sites such as Liverpool Waters (Liverpool), Parkside (St Helens) and Daresbury (Warrington). These have all been *included* within the Core Scenario.

The housing projections outside of Wirral are those agreed during consultations with each Merseyside district in 2011 and are thus representative of the best forecasts available at that time.

#### 3.4.1 Cheshire West and Chester

Given their close proximity to the Wirral boundary, several developments in Cheshire West and Chester were explicitly included in the Core Strategy forecasts. These developments are described within **Table 3.4** along with their projected employment and housing totals.

<sup>&</sup>lt;sup>1</sup> Economic Forecasts for the Liverpool City Region: Recession and Recovery. Technical Report. PION Economics and Cambridge Econometrics, December 2010



Table 2.4.	Lausing and Employment forecasts for sig	nificant dovelonments in Chechira West and Chester
Table 5.4.	HOUSING AND EMDIOVINENT TOTECASIS TOT SIG	milicani developments in Cheshire west and Chester

Sahama	2008-14		2014-2024	
Scheme	Dwellings	Jobs	Dwellings	Jobs
Ellesmere Quays	-	-	1250	-
Ledsham Road (Ellesmere Port)	100	-	1900	-
Rossfield Park (Ellesmere Port)	500	-	500	-
New Bridge Road (Ellesmere Port)	-	-	-	2000
Sainsburys (Neston)	-	170	-	-
Mas (Chashira Oska)	-	400 full time		
M&S (Cheshire Oaks)		150 Seasonal	-	-

Source: April 2012 CWaC development.xls [provided by Wirral Council]

## **3.5 Aggregation of Development Data to LCRTM zone**

The trip generation module of LCRTM requires development information in terms of housing numbers and employment to be entered at LCRTM zone level.

A correspondence between EWTM zones and LCRTM zones already exists. Hence, the development information provided by Wirral Council at the (finer) EWTM zone level was aggregated to the (coarser) LCRTM zone level.

#### **3.6 Seeding of Development Trips/Distribution**

For most model zones, the introduction of additional housing and employment numbers within the forecasting module is sufficient to derive a sensible estimate of trip productions and attractions using the mechanisms described earlier. However, with very large developments, where the projected land use is considerably different from the base year model, it is more appropriate to consider separate data sources. These would include existing Transport Assessments, which typically contain site-specific information for the overall volume and distribution of trips generated. This was the approach taken for Wirral Waters.

## **3.7 Forecast Networks**

Networks have been developed for two scenarios namely a *Do Minimum* (without Core Strategy) and a *Do Something* (with Core Strategy) for each of the assessment years.

The following committed schemes with respect to their opening years have been added to the base networks to form the 2014 and 2024 Do Minimum networks:

- Hall Lane Strategic Gateway;
- Tarbock Island (Junction 6 of M62);
- A5117 Deeside Park Junctions Improvement;
- A5300/A562 Speke Road Improvement;
- Mersey Gateway: 2<sup>nd</sup> Mersey crossing in Halton;
- Switch Island: Thornton Link Road; and
- North West Triangle rail electrification (Liverpool-Manchester and Liverpool-Wigan).

# Wirral Development Model Assessment of Wirral Core Strategy Transport Impacts



For the Do Something network, the electrification of the Borderlands Rail service between North Wales and Liverpool has been included.



#### 4 Assessment

#### Introduction 4.1

In this chapter the results from running LCRTM for the Do Minimum and Do Something (Core Strategy) scenarios are presented.

In the first instance, the impact of the Do-Something assumptions on mode share is considered, followed by statistics on the total vehicle kilometres and average trip distances. Following this, the impact of journey times to/from Wirral to/from surrounding districts and the wider City Region are presented.

The final stage of the LCRTM is the assignment of the travel demand on the highway (and public transport networks) after all the travel choices within the demand model have been taken into account. For the purpose of the current study the morning peak (08:00-09:00) and evening peak (17:00-18:00) have been considered at 2014 and 2024.

Using the model outputs, the "hot spots" in terms of the location of significant increases in traffic volumes and volume over capacity (V/C) ratios as well as travel times can be identified. Since LCRTM is a link based model, it is not currently possible to capture the impact of the developments on the operation of junctions. However, by determining where the level of traffic growth is at its greatest, the areas where impacts on junctions are likely can be identified.

#### 4.2 Mode Share

Tables 4.1 and 4.2 show the mode share for travel for all trips with at least one end of their journey in Wirral (i.e. a journey that starts, ends or is completely within Wirral).

It can be seen that there is little difference in the mode share between the Do Minimum and Do Something, with around 73% of all trips being by car, and 17% by public transport. This is to be expected given that the Core Strategy development lies within established urban and sub-urban areas.

Table 4.1: AM Mode Share			
АМ	Car	Freight	Public Transport
2008 (Base)	73.3%	8.5%	18.2%
2014 Do-Minimum	71.3%	9.5%	19.2%
2014 Do-Something	71.4%	9.4%	19.2%
2024 Do-Minimum	71.8%	11.0%	17.2%
2024 Do-Something	72.3%	10.5%	17.1%

#### 

#### Table 4.2: PM Mode Share

РМ	Car	Freight	Public Transport
2008 (Base)	75.4%	7.7%	16.9%
2014 Do-Minimum	72.3%	9.6%	18.1%
2014 Do-Something	72.5%	9.5%	18.0%
2024 Do-Minimum	72.5%	10.9%	16.6%
2024 Do-Something	73.0%	10.6%	16.5%



# 4.3 Highway Demand

**Tables 4.3** to **4.6** shows the change in the number of highway trips in each time period and forecast year between the Do Minimum and Do Something. Again, the analysis relates to all trips with at least one end of the journey within Wirral.

In the AM Peak, it can be seen that the Do Something leads to around a 1.6% increase in all highway trips in 2014 and 4.4% trips by 2024. In the PM peak, this growth is 1.6% and 3.9% respectively. The main contributor is growth in commuting trips.

#### Table 4.3: Highway Trips: 2014 AM Peak

АМ	Commute	Other	Employer's Business	Total
2008 Base	20,591	18,473	5,481	44,545
2014 Do-Minimum	21,442	18,623	5,502	45,567
2014 Do-Something	21,845	18,887	5,542	46,274
Absolute Difference	403	264	40	707
% Difference (Do Something-Do Minimum)	1.9%	1.4%	0.7%	1.6%

#### Table 4.4: Highway Trips: 2024 AM Peak

			Employer's	
AM	Commute	Other	Business	Total
2008 Base	20,591	18,473	5,481	44,545
2024 Do-Minimum	23,295	19,377	5,311	47,983
2024 Do-Something	24,807	19,894	5,412	50,113
Absolute Difference	1,512	517	101	2,130
% Difference (Do Something-Do Minimum)	6.5%	2.7%	1.9%	4.4%

#### Table 4.5: Highway Trips: 2014 PM Peak

АМ	Commute	Other	Employer's Business	Total
2008 Base	16,922	19,126	5,947	41,995
2014 Do-Minimum	17,229	19,744	6,030	43,004
2014 Do-Something	17,536	20,039	6,100	43,676
Absolute Difference	307	295	70	672
% Difference (Do Something-Do Minimum)	1.8%	1.5%	1.2%	1.6%

AM	Commute	Other	Employer's Business	Total
2008 Base	16,922	19,126	5,947	41,995
2024 Do-Minimum	18,056	21,285	6,348	45,689
2024 Do-Something	18,936	22,024	6,516	47,476
Absolute Difference	880	738	169	1,787
Difference (Do Something-Do Minimum)	4.9%	3.5%	2.7%	3.9%

#### Table 4.6: Highway Trips: 2024 PM Peak

### 4.4 Vehicle Kilometres

**Tables 4.7** to **4.10** shows the impact of the Core Strategy on total vehicle kilometres travelled for trips with at least one end of their journey in Wirral. The largest impact is reported at 2024 in the AM peak where it can be seen that overall, there is a 1.9% increase in vehicle-kilometres for all highway trip purposes. The increase in car commuting trip kilometres is the main contributor to the growth in trips. The change in the PM peak reported is much more modest, at less than 1%.

#### Table 4.7: 2014 AM Vehicle Kilometres

АМ	Car - Commute	Car- Other	Car - Employer's Business	Light Goods Vehicles	Other Goods Vehicles	Total
2008 Base	440,364,382	169,494,096	94,773,823	56,859,753	19,044,799	780,536,853
2014 Do-Minimum	463,176,044	158,176,734	92,501,354	66,656,715	19,973,882	800,484,729
2014 Do-Something	469,731,651	159,716,931	92,752,483	66,612,479	19,960,100	808,773,644
Absolute Difference	6,555,607	1,540,197	251,129	-44,237	-13,783	8,288,914
Difference (Do Something- Do Minimum)	1.4%	1.0%	0.3%	-0.1%	-0.1%	1.0%

#### Table 4.8: 2024 AM Vehicle Kilometres

	Car -		Car - Employer's	Light	Other Goods	
АМ	Commute	Car- Other	Business	Vehicles	Vehicles	Total
2008 Base	440,364,382	169,494,096	94,773,823	56,859,753	19,044,799	340,172,471
2024 Do-Minimum	505,077,562	173,123,677	90,851,672	84,683,207	21,635,053	875,371,171
2024 Do-Something	517,776,448	175,740,575	90,974,174	85,244,670	21,853,355	891,589,222
Absolute Difference	12,698,886	2,616,898	122,502	561,463	218,301	16,218,051
Difference (Do Something-Do Minimum)	2.5%	1.5%	0.1%	0.7%	1.0%	1.9%



#### Table 4.9:2014 PM Vehicle Kilometres

РМ	Car - Commute	Car- Other	Car - Employer's Business	Light Goods Vehicles	Other Goods Vehicles	Total
2008 Base	409,540,577	259,953,293	116,591,254	56,472,340	10,282,005	852,839,469
2024 Do-Minimum	419,702,055	271,061,726	116,298,150	66,083,338	10,745,974	883,891,243
2024 Do-Something	422,787,950	273,623,627	117,227,227	66,100,330	10,740,832	890,479,967
Absolute Difference	3,085,896	2,561,901	929,077	16,992	-5,141	6,588,724
Difference (Do Something- Do Minimum)	0.7%	0.9%	0.8%	0.0%	0.0%	0.7%

#### Table 4.10: 2024 PM Vehicle Kilometres

РМ	Car - Commute	Car- Other	Car - Employer's Business	Light Goods Vehicles	Other Goods Vehicles	Total
2008 Base	409,540,577	259,953,293	116,591,254	56,472,340	10,282,005	852,839,469
2024 Do-Minimum	442,345,015	308,463,271	123,157,092	84,052,816	11,582,861	969,601,056
2024 Do-Something	441,994,408	311,492,559	122,979,317	83,935,374	11,568,441	971,970,099
Absolute Difference	-350,607	3,029,287	-177,775	-117,442	-14,420	2,369,044
Difference (Do Something-Do Minimum)	-0.1%	1.0%	-0.1%	-0.1%	-0.1%	0.2%

# 4.5 Average Trip Length

**Tables 4.11** and **4.12** show the average length of a trip in the AM and PM peak hours. It can be seen that the Core Strategy is predicted to result in a slight reduction in the average trip length. This also suggests that whilst there is an increase in the demand for travel as a result of implementing the Core Strategy, the locations of the planned developments do not lead to longer journeys.

Table 4.11: AM

АМ	2008 Average Trip Distance (km)	2014 Average Trip Distance (km)	2024 Average Trip Distance (km)
Do Minimum	11.8	11.6	11.9
Do Something	11.8	11.6	11.7
% Change	NA	0	-1.7

Table 4.12: PM

РМ	2008 Average Trip Distance (km)	2014 Average Trip Distance (km)	2024 Average Trip Distance (km)
Do Minimum	12.7	13.7	14.0
Do Something	12.7	13.6	13.6
% Change	NA	-0.7	-2.9



# 4.6 Journey Times

**Tables 4.13** to **4.16** show the impact of the Core Strategy on average journey times between Wirral and surrounding districts as well as the wider city region. In general, the results show small changes between the Do Minimum and Do Something.

Positive values in the tables indicate that the journey times are greater under the Core Strategy and are generally observed in the AM peak (albeit in small numbers) coming into Wirral from outside, or trips wholly within Wirral, with decreases reported for trips in the opposite direction (i.e. leaving Wirral). The converse is true of the PM peak – where we see increased journey times for vehicles leaving Wirral.

The results point towards Wirral being more attractive as a destination (for employment and other purposes) in the Core Strategy thus increasing traffic on the main routes into the district, and on routes within the district.



To From	Liverpool	Wirral	Knowsley	Sefton	St Helens	Halton	West Lancashire	Ellesmere Port and Neston	Rest of the Study Area	Externals
Liverpool		0.17								
Wirral	-0.08	0.04	-0.14	-0.03	-0.26	0.24	-0.08	0.09	0.15	-0.22
Knowsley		0.06								
Sefton		0.01								
St Helens		0.01								
Halton		0.42								
West Lancashire		-0.02								
Ellesmere Port and Neston		0.02								
Rest of the Study Area		0.65								
Externals		0.04								
Table 4.14:	2024 AM	Do-Minim	um comp	pared to 2	014 Do S	Something	g: Absolu	ute Differe	nce (mins	;)
Table 4.14: To From	2024 AM	Do-Minim Wirral	um comp Monsient Knowsient	pared to 2	014 Do S st Helens St Helens	Something Taito H	West Lancashire	Ellesmere Port and Neston Neston	Rest of the Study Area	Externals
Table 4.14: To From Liverpool	2024 AM	Do-Minim Wirral 0.44	num comp Aaiswouy	pared to 2	014 Do S	Something	West Lancashire	Ellesmere Port and Neston Neston	Rest of the Study Area	Externals
Table 4.14: To From Liverpool Wirral	2024 AM	Do-Minim Wirral 0.44 0.23	hum comp Aajswouy -0.46	<u>و</u> معتقد من علم من معتقد من علم من معتقد م معتقد معتقد من معتقد م معتقد معتقد من معتقد م معتقد معتقد من معتقد م معتقد معتقد من معتقد م معتقد معتقد من معتقد م معتقد معتقد من معتم من معتقد م معتقد معتقد من معتقد م معتقد معتقد معتقد من معتقد معتقد من معتقد من معتم من معتم م معتقد من معتم من معتقد من معتقد من م	014 Do S	Something	rancashire Lancashire -0.55	ute Differe and out and eston BIE O.55	nce (mins Kest of the Strudy Area 0.43	Externals Externals
Table 4.14: To From Liverpool Wirral Knowsley	2024 AM	Do-Minim     Wirral     0.44     0.23     0.27	num comp	<u>ومعتوط to 2</u> ولي <u>ولي</u> -0.19	014 Do S super H to -0.6	Something	g: Absolu Mest Faucashire -0.55	ute Differe Ellessmere Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston Neston	nce (mins Rest of the Strudy Area 0.43	Externals Externals
Table 4.14: To From Liverpool Wirral Knowsley Sefton	2024 AM	Do-Minim     Wirral     0.44     0.23     0.27     0.41	num comp	<u>ومعتوط to 2</u> وي -0.19	014 Do S	Something	rancashire Lancashire 2.0.5	ute Differe Blessmere Veston Veston 0.55	nce (mins Kest of the Stridy Area 0.43	Externals
Table 4.14: To From Liverpool Wirral Knowsley Sefton St Helens	2024 AM	Do-Minim     Wirral     0.44     0.23     0.27     0.41     0.68	-0.46	<u>ویات -0.19</u>	014 Do S	Something	g: Absolu Rest Faucashire	ute Differe	Rest of the Study Area 0.43	EXternals
Table 4.14: To From Liverpool Wirral Knowsley Sefton St Helens Halton	2024 AM	Do-Minim     Wirral     0.44     0.23     0.27     0.41     0.68     1.41	-0.46	<u>و</u> بون وی -0.19	014 Do S	Something	g: Absolu est Faucaspire -0.55	ute Differe	nce (mins Kest of the Strudy Area 0.43	Externals Externals
Table 4.14:   To   From   Liverpool   Wirral   Knowsley   Sefton   St Helens   Halton   West   Lancashire	2024 AM	Do-Minim     Wirral     0.44     0.23     0.27     0.41     0.68     1.41     0.41	-0.46	-0.19	014 Do S	Something	g: Absolu Rest Laucashire	ute Differe	nce (mins Kest of the Strdy Area 0.43	EXTERNAL
Table 4.14:   To   From   Liverpool   Wirral   Knowsley   Sefton   St Helens   Halton   West   Lancashire   Ellesmere Port   and Neston	2024 AM	Do-Minim   Wirral   0.44   0.23   0.27   0.41   0.68   1.41   0.41   0.41   0.35	-0.46	-0.19	014 Do S	Something	g: Absolu est faucashire -0.55	ute Differe	nce (mins Kest of the Strody Area	EXTERNAL
Table 4.14:   To   From   Liverpool   Wirral   Knowsley   Sefton   St Helens   Halton   West   Lancashire   Ellesmere Port and Neston   Rest of the Study Area	2024 AM	Do-Minim   Wirral   0.44   0.23   0.27   0.41   0.68   1.41   0.41   0.41   0.35   1.22	-0.46	<u>و</u> وی -0.19	-0.6	Something	g: Absolu	ute Differe Blesser Vestor 0.55	nce (mins Kest of the Stridy Area 0.43	Externals

#### Table 4.13:2014 AM Do-Minimum compared to 2014 Do Something: Absolute Difference (mins)



To From	Liverpool	Wirral	Knowsley	Sefton	St Helens	Halton	West Lancashire	Ellesmere Port and Neston	Rest of the Study Area	Externals
Liverpool		-0.12								
Wirral	0.06	0.05	0.11	0.45	-0.12	-0.02	0.03	0.05	0.38	-1.02
Knowsley		-0.1								
Sefton		-0.06								
St Helens		-0.21								
Halton		0.03								
West Lancashire		-0.19								
Ellesmere Port and Neston		0.02								
Rest of the Study Area		0.1								
Externals		0.05								
Table 4.40										
Table 4.16.	iverpool	Do-Minim	um comp	pared to 2	014 Do S	omething	Vest ancashire	Are Differe	Rest of the study Area	Externals
Table 4.16.	CO24 PM	Do-Minim	Knowsley Knowsley	bared to 2	014 Do S	Comething Lang Halfor Halfor Halfor	Mest Lancashire	Ellesmere Fort and Neston	Rest of the Study Area	Externals
Table 4. To. To From Liverpool	Citer PM	UDo-Minim	um comp Aalswoury	Entry Strength Streng	014 Do S	Something Tatto H	Rest Francashire	Ellesmere Neston Neston	Study Area	Externals
Liverpool Wirral Knowsley	2024 PM	Wirral -0.37 0.12	UM COMP	<u>5</u> වූ ව හ ර ය ර ර ර ර ර ර ර ර ර ර ර ර ර ර ර ර ර	014 Do S	Something	g: Absolu Mest Laucashire -0.11	ute Differe Elleswere Neston Neston 0.26	Kest of the Study Area Study Area	EXternals
Liverpool Wirral Knowsley Sefton	2024 PM	Wirral -0.37 0.12 -0.29 -0.19	UM COMP Aarswoory 0.13	<u>ව</u> වූ ව ව ව ය අ	014 Do S suaja H to 0.18	Something	g: Absolu Mest Faucashire -0.11	ute Differe Elleswere Neston Neston 0.26	Kest of the Study Area Study Area	s) Externals Externals
Liverpool Wirral Knowsley Sefton St Helens	2024 PM	Wirral -0.37 0.12 -0.29 -0.19 -0.28	UM COMP	<u>معتود معتود معتو معتود معتود معت </u>	014 Do S	Something	g: Absolu Mest Laucashire	ute Differe elleswere Neston 0.26	Rest of the Study Area Study Area	EXternals
Liverpool Wirral Knowsley Sefton St Helens Halton	2024 PM	Wirral -0.37 0.12 -0.29 -0.19 -0.28 0.45	UM COMP	<u>ව</u> වූ ව ර ර ර ර ර ර ර ර ර ර ර ර ර ර ර ර ර	014 Do S	Something	g: Absolu Rest Faucashire -0.11	ute Differe Elleswere Neston 0.26	Kest of the Rest of the Study Area 0.57	s) Externals -3.27
Liverpool Knowsley Sefton St Helens Halton West Lancashire	2024 PM	Do-Minim   Wirral   -0.37   0.12   -0.29   -0.29   -0.19   -0.28   0.45   -0.22	UM COMP	<u>වූ</u> වූ 0.34	014 Do S Support 0.18	Something	g: Absolu Mest Caucashire	ute Differe	Study Area Study Area 0.57	(;) (;) (;) (;) (;) (;) (;) (;) (;) (;)
Table 4. To.   To   From   Liverpool   Wirral   Knowsley   Sefton   St Helens   Halton   West   Lancashire   Ellesmere Port and Neston	2024 PM	Do-Minim   Wirral   -0.37   0.12   -0.29   -0.19   -0.28   0.45	UM COMP	0.34	014 Do S	50mething 1.08	g: Absolu Rest -0.11	ute Differe	Kest of the Rest of the Study Area	s) Since the second se
Table 4. To.   To   From   Liverpool   Wirral   Knowsley   Sefton   St Helens   Halton   West   Lancashire   Ellesmere Port   and Neston   Rest of the   Study Area	2024 PM	Do-Minim   Wirral   -0.37   0.12   -0.29   -0.19   -0.28   0.45   -0.22   0.4   0.23		0.34	014 Do S	Something 1.08	rancashire	ute Differe Ellesmere Neston 0.26	Study Area	S)

#### Table 4.15:2014 PM Do-Minimum compared to 2014 Do Something: Absolute Difference (mins)



# 4.7 Assignment Analysis

The assignment of the 2024 Do Minimum and Do Something highway matrices have been compared to identify the likely hot-spots in terms of the impact on network performance in Wirral as a result of implementing the Core Strategy. In the first instance, an analysis has been undertaken of the performance of the Do Minimum scenario – i.e. what is the impact of forecast developments that do not include the components of the Core Strategy.

Following the analysis of the Do Minimum, three different measures have been used to show where as a result of increases in traffic over the Do Minimum there may be additional performance issues in terms of the delay experienced by road users.

The following analyses have been undertaken:

- Identifying where absolute flow changes could be considered to be materially significant. This has been based on identifying those links where the increase in flow under the Core Strategy is greater than 5% with a corresponding change in flow of more than 50 vehicles per hour.
- Identifying where the volume over capacity ratio in the Do Something scenario exceeds 85% on a link that in the Do Minimum was less than 85%; i.e. this identifies where capacity is close to being exceeded and likely to cause congestion with implementing the Core Strategy developments.
- Identifying where the link travel time in the Do Something scenario is 5% greater than the travel time in the Do Minimum, and the absolute change in travel time is greater than one minute.

A series of outputs from the model are presented in **Appendices E to I.** The output is shown at two geographical levels: firstly for the area around the east of Wirral, centred on the Dock area, and secondly showing Wirral as a whole, including adjacent areas of West Cheshire. A plot is provided in **Appendix D** to illustrate key road names to aid in the interpretation of the figures.

## 4.8 Analysis of the Do Minimum

The impact of the Do Minimum developments is shown in **Appendix E.** It can be seen from the network plots that by 2014 there are already several links in Wirral that have a volume over capacity ratio (V/C) exceeding 85%. Whilst a V/C ratio of 100% indicates a road at capacity, anything above 85% is indicative of a road approaching capacity, where congestion and negative impacts on journey times can be expected. Comparing the 2014 and 2024 results it is evident that significantly more links pass the 85% threshold at the later year.

The main point to take from this analysis is that even without the Core Strategy developments there are areas in Wirral where the road network is forecast to be reaching capacity, with many of these roads focussed around the Dock area and parts of Birkenhead.

## 4.9 Flow plots

Output network plots can be found in **Appendix F** which shows the locations where the traffic flow exceeds the Do Minimum by 5% and by more than 50 vehicles. **Appendix I** provides the traffic flow levels for the 2024 forecast year.

There is little impact of the Core Strategy at 2014. By 2024, however it can be seen that in both the AM and PM peaks, the main focus on traffic growth is the area bounded by the Dock Road to the north, Wallasey



Bridge Road to the west, Hoylake Road, Park Road North, Conway Street to the South and Chester Street to the east, i.e. immediately surrounding the East and West Float.

There are also material increases in traffic along the radial routes into/out of this area – i.e. the A5027 (Upton Road) and A552 (Borough Road), Mount Road, Church Road, Argyle Street, Old Chester Road, New Chester Road and the A41 (Rock Ferry Bypass).

There are also sections of the M53 (notably between Junction 10 and Junction 4) that have a greater than 5% increase in traffic growth, although this is reported in the AM peak only.

There is not a material increase in traffic using either of the two Mersey tunnels.

### 4.10 Volume over Capacity Ratios

Output network plots can be found in **Appendix G** which shows the links where the volume over capacity (V/C) in the Core Strategy is greater than 85% where it was less than 85% in the Do Minimum. **Appendix I** provides the V/C value for the 2024 forecast year.

At 2014 there are only a handful of locations where this criterion is satisfied.

By 2024 noticeably more locations are identified. In the AM peak, sections of Borough Road (V/C 86%), Church Road (85%), Old Chester Road (87%) and New Chester Road in Birkenhead (93%). Port Sunlight (99%) and Eastham (87%) are affected.

Around the East and West Float there are a few locations identified, including, Park Road South (V/C 90%), Duke Street (88%), Tower Road (97%) and Cleveland Street (85%).

The M53 is not predicted to perform materially worse with the additional traffic, nor are the road tunnels.

In the PM peak, the main impacts are seen around the dock areas, including: Corporation Road (V/C 105%), Wallasey Bridge Road (109%), Dock Road (91%), Duke Street (94%), Park Road North (87%) and Birkenhead Road (85%).

Hence, in comparison to the Do-Minimum, there are relatively few additional locations where the volume over capacity ratio is greater than 85% (100% being operating at capacity) with the Core Strategy. This indicates that the Core Strategy is unlikely to have wide-ranging impacts on the performance of the highway network over and above what would be expected in the Do Minimum.

## 4.11 Change in Link Travel Times

Output network plots can be found in **Appendix H** which shows the links where journey times are expected to increase by over 5% and one minute in the Core Strategy compared to the Do Minimum. The increment in journey time is shown in **Appendix I** for 2024.

At 2014 it can seen that there are virtually no links meeting this criterion; with only a small increase in number by 2024. The locations affected are broadly consistent those where the link flow increases are at their greatest – as would be expected.



# 5. Conclusions

A development scenario comprising Wirral's Core Strategy (i.e. Do Something) has been modelled using the Liverpool City Region Model (LCRTM) and compared to a Do Minimum scenario (i.e. without the Core Strategy). The assessment has been undertaken at 2014 and 2024 and has focussed on understanding the additional impact of the Core Strategy over and above that expected from the Do Minimum.

In the first instance it has been shown that in the Do Minimum scenario many roads in the East Wirral area having a volume over capacity ratio in excess of 85%. This means there are likely to be highway issues to address even without additional traffic from the Core Strategy developments. The modelling has not taken into account the highway improvements that might be implemented to mitigate the Do Minimum impacts.

At 2014 the additional impact from the Core Strategy is barely detectable, whilst at 2024 there are areas of the network that are likely to exhibit noticeable increases in traffic and available capacity compared to the Do Minimum.

The impact of the Core Strategy is seen most notably in the area immediately surrounding the East and West Floats and on some of the routes leading into and out of this area. Here, there is the greatest concentration of roads where the increase in link flow is likely to be in excess of 5% (and 50 vehicles), and where link travel times are likely to increase by more than 5%.

Where flows are greater than 5%, there is, in general, little additional impact, over the Do Minimum on the capacity remaining on these roads; however this is not to say that junction delays will be insignificant. A more detailed modelling approach would be required to examine the operation of junctions in these areas.

However, the model outputs suggest that the "*hot-spots*" in terms of the additional impact of the Core Strategy on the highway network performance are likely to be limited to a relatively small area of the Borough and unlikely to have notable impact on wider road network, including the M53 motorway and both the Mersey tunnels.

From the modelling work undertaken, it can be concluded that the Core Strategy is likely to impact upon the performance of the road network mostly within the area around the East and West Floats. It is, however, it is expected that targeted junction improvements combined with demand management measures such as enhancements to public transport services would provide mitigation against these impacts. It is anticipated that the developers wishing to develop the area would contribute to the cost of the improvement measures, it is anticipated that these measures would be in addition to any improvements that are put in place to address the impacts of the Do Minimum scenario.

More detailed work, using the East Wirral SATURN model is recommended to establish the level of highway improvements required, whilst enhancements to the Public Transport Network could be modelled in LCRTM. The focus of the further modelling work should broadly be focused on the area shown in **Figure 5.1**.




Figure 5.1: Recommended area for detailed modelling of Core Strategy impacts



## Appendices

Appendix A. Housing Data	28
Appendix B. Employment Forecast	34
Appendix C. Development Maps	40
Appendix D. Key to Figures	47
Appendix E. Do Minimum Analysis	50
Appendix F. Flow Changes	53
Appendix G. Volume over Capacity Ratio	58
Appendix H. Link Travel Time	63
Appendix I. Detailed LCRTM Assignment Outputs	68



# Appendix A. Housing Data

Table A.1:Housing Data – Do Minimum

Zone	No. of units 2008-2014	No. of units 2014- 2024	Total: 2008-2024
1	2	4	6
2	1	2	3
4	5	8	13
5	18	30	48
9	4	6	10
10	3	4	7
11	8	14	22
12	0	0	1
13	4	6	10
14	1	1	2
16	38	63	102
17	27	45	71
18	3	5	8
19	1	2	3
20	5	9	14
22	4	7	11
23	283	471	754
24	17	29	47
25	151	252	404
26	183	306	489
27	2	4	6
28	0	1	1
29	26	44	70
30	1	2	3
31	2	3	4
32	8	13	22
33	23	39	62
34	11	18	28
35	7	12	19
36	14	23	36
37	6	10	16
38	3	6	9
39	1	1	1
40	2	3	4
41	6	10	16
42	3	5	8
43	1	1	2
50	146	243	389
51	9	16	25
52	21	35	55
54	64	107	172
57	1	1	2

305374/ITD/ITN/001/00D 29 August 2012

305374\Wirral Development\_Assessment of Core Strategy\_Final Issue.doc



Zone	No. of units 2008-2014	No. of units 2014- 2024	Total: 2008-2024
58	17	29	46
59	4	7	12
60	14	23	37
61	27	44	71
62	11	19	30
63	3	4	7
64	1	2	3
65	8	13	20
66	11	18	28
67	7	12	20
68	6	10	16
69	1	2	4
70	46	76	122
71	16	26	42
72	10	17	27
73	0	1	1
74	3	5	8
75	4	6	9
76	3	5	8
77	6	10	15
78	7	12	20
79	0	0	0
82	33	55	88
85	2	4	6
86	2	3	5
88	22	36	58
89	80	134	214
90	51	86	137
91	13	21	34
92	112	187	299
93	7	12	19
94	10	16	26
95	24	39	63
97	38	63	101
98	11	18	29
_100	6	10	15
101	1	1	2
102	13	22	35
103	43	71	114
104	95	159	254
105	51	85	136
106	13	22	35
108	2	4	6
113	1	1	2



Zone	No. of units 2008-2014	No. of units 2014- 2024	Total: 2008-2024
114	2	3	5
115	1	2	3
116	10	17	28
117	1	1	2
118	9	14	23
119	3	5	9
120	65	109	174
121	7	12	19
122	21	35	56
123	5	9	14
125	18	30	49
126	1	2	4
127	8	13	21
128	49	81	130
129	3	6	9
131	6	10	16
132	4	6	10
133	5	9	14
134	0	0	0
135	5	8	12
136	14	23	37
137	19	32	51
138	20	33	53
139	33	54	87
140	30	50	80
141	2	4	6
145	3	5	8
147	2	3	5
148	8	14	22
149	10	16	26
150	3	5	8
151	61	101	162
152	2	3	5
154	20	34	54
Grand Total	2400	4000	6400



Zone	No. of units 2008-2014	No. of units 2014- 2024	Total: 2008-2024
1	0	9	9
2	2	4	6
4	33	29	62
5	10	302	312
9	7	22	29
10	3	9	12
11	38	12	50
12	0	2	2
13	33	9	42
14	6	1	7
16	175	49	224
17	131	37	168
18	2	11	13
19	4	4	8
20	6	19	25
22	39	11	49
23	510	3318	3828
24	0	133	133
25	273	1773	2046
26	131	629	760
27	5	7	12
28	1	1	2
29	61	19	80
30	1	5	6
31	13	7	20
32	23	17	39
33	104	16	120
34	52	36	88
35	51	13	64
36	111	27	139
37	8	10	18
38	8	15	23
39	0	4	4
40	11	3	14
41	21	5	26
42	10	8	18
43	2	1	3
50	0	696	696
51	0	44	44
52	30	8	38
54	131	88	219
57	2	2	4
58	30	6	36

#### Table A.2: Housing Data – Do Something

305374/ITD/ITN/001/00D 29 August 2012

305374\Wirral Development\_Assessment of Core Strategy\_Final Issue.doc



Zone	No. of units 2008-2014	No. of units 2014- 2024	Total: 2008-2024
59	19	4	23
60	11	3	14
61	13	3	16
62	19	15	34
63	6	4	10
64	1	0	1
65	27	28	55
66	49	20	69
67	25	23	48
68	13	3	17
69	1	0	1
70	62	14	76
71	22	8	30
72	14	6	21
73	1	1	2
74	12	3	15
75	8	2	10
76	21	5	26
77	65	16	81
78	44	16	60
79	3	0	3
82	153	67	220
84	7	0	7
85	2	7	9
86	6	2	8
88	77	2	79
89	30	8	38
90	41	15	56
91	39	8	47
92	95	21	116
93	13	12	25
94	16	14	30
95	2	1	3
97	186	46	232
98	28	7	35
100	9	2	11
101	1	0	1
102	27	29	56
103	35	17	52
104	20	46	66
105	44	67	111
106	25	7	32
108	1	4	5
112	1	0	1



Zone	No. of units 2008-2014	No. of units 2014- 2024	Total: 2008-2024
113	2	0	2
114	1	0	1
115	1	0	1
116	7	7	14
117	2	0	2
118	6	1	7
119	6	1	7
120	29	114	144
121	0	20	20
122	44	16	60
123	14	3	17
125	69	17	86
126	2	1	3
127	27	3	30
128	112	15	127
129	2	1	3
131	52	10	62
132	5	3	8
133	17	3	20
134	7	0	7
135	16	10	26
136	82	49	131
137	14	66	80
138	56	14	70
139	0	101	101
140	160	71	231
141	8	3	11
144	1	0	1
145	15	4	19
147	8	1	9
148	58	10	68
149	26	10	36
150	21	6	27
151	240	50	290
152	0	7	7
154	10	3	13
Grand	4491	8599	13090



## Appendix B. Employment Forecast

Table B.1: Do Minimum: Total E	mployment Forecast		
Model Zone	2008-2014	2014-2024	Total: 2008-2024
1	119	67	187
2	6	20	26
3	36	102	138
4	23	38	60
5	39	65	104
6	73	123	196
8	6	10	16
9	70	118	188
10	32	52	84
12	115	0	115
14	138	311	449
15	282	471	752
16	41	0	41
23	221	369	590
24	36	59	95
25	107	179	286
26	136	226	363
27	1	2	3
28	24	40	63
29	7	11	18
30	70	117	187
36	5	0	5
39	25	176	201
40	0	1	1
43	82	138	220
44	151	253	404
45	6	11	17
46	40	66	106
47	216	360	575
50	356	593	949
52	26	43	68
54	58	97	155
55	58	97	155
59	19	31	49
65	1	1	2
68	18	3	21
69	17	0	17
71	3	0	3
72	0	16	16
75	0	8	8
79	0	36	36
83	524	0	524

305374/ITD/ITN/001/00D 29 August 2012

305374\Wirral Development\_Assessment of Core Strategy\_Final Issue.doc



Model Zone	2008-2014	2014-2024	Total: 2008-2024
84	3	5	8
85	37	60	97
88	38	63	101
89	192	319	511
90	7	1	8
91	67	0	67
94	1	1	2
96	118	196	313
100	0	1	1
102	9	16	25
103	7	143	150
105	75	0	75
106	15	0	15
108	18	31	48
109	94	156	250
112	30	50	79
121	447	745	1192
122	0	1	1
124	635	1059	1693
125	42	55	97
128	436	726	1162
129	76	128	204
134	0	39	39
136	3	1	4
138	725	1205	1930
153	243	405	648
Total	6497	9712	16209



Model Zone	2008-2014	2014-2024	Total: 2008-2024
1	115	60	174
2		10	10
3		43	43
12	115		115
14		82	82
16	41		41
36	5		5
39	25	176	201
68	16		16
69	17		17
71	3		3
72		16	16
75		7	7
79		35	35
83	368		368
90	6		6
91	67		67
103	7	142	149
105	75		75
106	15		15
125	9		9
134		39	39
136	3		3
138	2		2
Total	886	609	1495

Table B.2: Do Minimum: Retail Employment Forecast



Model Zone	2008-2014	2014-2024	Total: 2008-20 <u>2</u> 4
1	138	60	198
2	28	40	68
3	57	216	273
4	18	62	81
5		1513	1513
6		365	365
7		1319	1319
8	19		19
9	266	2	268
10	40	103	143
12	115		115
14	15	309	324
15	193	1211	1404
16	41		41
23	116	1178	1294
24	116	1178	1294
25	116	1178	1294
26	116	1178	1294
27	10		10
28	22	97	119
29	0		0
30	120	227	347
36	5		5
39	25	176	201
40	7		7
43	23	397	420
44	77	678	755
45		32	32
46		198	198
47	644		644
49		1666	1666
50		1772	1772
52	126		126
54		290	290
55		290	290
59		92	92
65	5		5
68	43		43
69	17		17
71	3		3
72		16	16

Table B.3:	Do Something:	Total Employm	nent Forecast



Model Zone	2008-2014	2014-2024	Total: 2008-2024
75	5	7	12
79	16	35	51
83	524		524
84	15		15
85	159	22	181
88	188		188
89	58	906	964
90	6		6
91	67		67
94	3		3
96	462	175	637
100	5		5
102	60	400	460
103	11	142	153
105	75		75
106	15		15
108	3		3
109		467	467
112	138	10	148
121	103	1651	1753
122	3		3
124	2006	1516	3522
125	173		173
128		2169	2169
129		381	381
134		39	39
136	5		5
138	2293	1010	3303
153		1211	1211
Total	8911	25978	34888



Model Zone	2008-2014	2014-2024	Total: 2008-2024
1	115	60	174
2		10	10
3		43	43
5		118	118
7		118	118
12	115		115
14		82	82
16	41		41
23	16	105	120
24	16	105	120
25	16	105	120
26	16	105	120
36	5		5
39	25	176	201
68	16		16
69	17		17
71	3		3
72		16	16
75		7	7
79		35	35
83	368		368
90	6		6
91	67		67
103	7	142	149
105	75		75
106	15		15
125	9		9
134		39	39
136	3		3
138	2		2
Total	949	1263	2212

#### Table B.4: Do Something: Retail Employment Forecast



## Appendix C. Development Maps

In this appendix plots are provided showing the location and size of the developments tested under the Core Strategy and Do Minimum scenarios.

The developments are plotted in their respective East Wirral Traffic Model zone and the size (in terms of number of households or employment numbers) is represented by means of a graded colour scale.

### Wirral Development Model Assessment of Wirral Core Strategy Transport Impacts



#### Figure C.1: Do Minimum: Net increase in total employment 2008-2014



Figure C.2: Core Strategy: Net increase in total employment 2008-2014



### Wirral Development Model Assessment of Wirral Core Strategy Transport Impacts



#### Figure C.3: Do Minimum: Net increase in total employment 2008-2024

Figure C.4: Core Strategy: Net increase in total employment 2008-2024











#### Figure C.6: Core Strategy: Net increase in households 2008-2014



### Wirral Development Model Assessment of Wirral Core Strategy Transport Impacts



#### Figure C.7: Do Minimum: Net increase in households 2008-2024

Figure C.8: Core Strategy: Net increase in households 2008-2024







#### Figure C.9: Do Minimum: Net increase in retail employment 2008-2014

#### Figure C.10: Core Strategy: Net increase in retail employment 2008-2014





### Wirral Development Model Assessment of Wirral Core Strategy Transport Impacts



#### Figure C.11: Do Minimum: Net increase in retail employment 2008-2024

#### Figure C.12: Core Strategy: Net increase in retail employment 2008-2024







# Appendix D. Key to Figures

**Figures D.1** and **D.2** show a selection of key road names in Wirral in relation to LCRTM's representation of the road network. These images are provided to aid readers in the interpretation of subsequent illustrations.



Figure D.1: Key Road Names – Dock Area





#### Figure D.2: Key Road Names - Wirral





## Appendix E. Do Minimum Analysis

The following plots show where the link volume over capacity (V/C) ratio in the Do Minimum scenario exceeds **85%**.

Links meeting this criterion are highlighted by thick red lines.

Figures E.1 and E.2 refer to the AM peak at 2014 and 2024 respectively

Figures E.3 and E.4 refer to the PM peak at 2014 and 2024 respectively.





Figure E.1: 2014 AM Do Minimum. Links where V/C >85%





Figure E.3: 2014 PM Do Minimum. Links where V/C >85%



## Appendix F. Flow Changes

The following plots show where the absolute change in traffic flow as a result of the Core Strategy could be considered materially significant. This has been based on identifying those links where the increase in traffic is greater than **5%** with a corresponding change in flow of more than **50** vehicles per hour.

Links meeting this criterion are highlighted by thick red lines.

The illustrations are arranged to show the 2014 and 2024 forecasts side by side, for east Wirral and also centred on the Dock area.

Figures F.1 to F4 refer to the AM peak; Figures F.5 to F.8 refer to the PM peak.









Figure F.2: 2024 AM - Material increases in traffic flow (Core compared to Do Min).



Figure F.4: 2024 AM - Material increases in traffic flow (Core compared to Do Min).



### Figure F.3: 2014 AM - Material increases in traffic flow (Core compared to Do Min).



Figure F.6: 2024 PM - Material increases in traffic flow (Core compared to Do Min).



### Figure F.5: 2014 PM - Material increases in traffic flow (Core compared to Do Min).





### Figure F.7: 2014 PM - Material increases in traffic flow (Core compared to Do Min).

Figure F.8: 2024 PM - Material increases in traffic flow (Core compared to Do Min).





# Appendix G. Volume over Capacity Ratio

The following plots show where the volume over capacity (V/C) in the Core Strategy is **greater than 85%** when in the Do Minimum it was **less than 85%**. I.e. the analysis identifies where the implementation of the Core Strategy is likely to cause a link to become close to capacity.

Links meeting this criterion are highlighted by thick red lines.

The illustrations are arranged to show the 2014 and 2024 forecasts side by side, for east Wirral and also centred on the Dock area.

Figures G.1 to G4 refer to the AM peak; Figures G.5 to G.8 refer to the PM peak.





Figure G.2: 2024 AM - – V/C Core >85% where V/C Do Min <85%







Figure G.3: 2014 AM – V/C Core >85% where V/C Do Min <85%





Figure G.5: 2014 PM – V/C Core >85% where V/C Do Min <85%




#### Figure G.7: 2014 PM – V/C Core >85% where V/C Do Min <85%

Figure G.8: 2024 PM – V/C Core >85% where V/C Do Min <85%



305374/ITD/ITN/001/00D 29 August 2012 305374\Wirral Development\_Assessment of Core Strategy\_Final Issue.doc



# Appendix H. Link Travel Time

The following plots show where the link travel time in the Core Strategy exceeds the Do Minimum travel time by **5%** and the absolute difference is greater than **one** minute.

Links meeting this criterion are highlighted by thick red lines.

The illustrations are arranged to show the 2014 and 2024 forecasts side by side, for east Wirral and also centred on the Dock area.

Figures H.1 to H.4 refer to the AM peak; Figures H.5 to H.8 refer to the PM peak.



Figure H.2: 2024 AM – Increase in link travel time > 5% and 1 Minute

Figure H.1: 2014 AM – Increase in link travel time > 5% and 1 Minute





Figure H.3: 2014 AM – Increase in link travel time > 5% and 1 Minute





Figure H.6: 2024 PM – Increase in link travel time > 5% and 1 Minute







Figure H.7: 2014 PM – Increase in link travel time > 5% and 1 Minute

305374/ITD/ITN/001/00D 29 August 2012 305374\Wirral Development\_Assessment of Core Strategy\_Final Issue.doc



# Appendix I. Detailed LCRTM Assignment Outputs

The following plots provide further detail on the comparison of the Do Minimum and Do Something at 2024.

**Figures I.1** and **I.2** show the traffic flow on those links where the increase in flow is greater than 5% and the actual increase is greater than 50 vehicles.

**Figures I.3** and **I.4** show the V/C values on those links where in the Core Strategy the V/C exceeds 85% but in the Do Minimum was less than 85%.

**Figures I.5** and **I.6** show the actual change in the link travel time (in minutes) on those links where the increase in travel time is greater than 5%.

In each case, the links meeting the criteria are highlighted in red.

### Figure I.1: Flow Difference 2024 AM





Figure I.2: Flow Difference 2024 PM





## Figure I.3: Volume over Capacity: AM 2024





## Figure I.4: Volume over Capacity: PM 2024





### Figure I.5: Link Travel Time: AM 2024





### Figure I.6: Link Travel Time: PM 2024







Page intentionally blank