Darlington Local Plan

STRATEGIC TRANSPORT MODELLING

Report

16/06/2015
Contents

LOCAL PLAN PROPOSALS 4
  development quantums ..................... 4
  Sensitivity test approach .................. 4
  Development trips .......................... 5
  background growth ......................... 5
  outcomes assessed ......................... 5
  outcomes reported in this note .......... 5
  Do minimum ................................ 5
  scenario 1 .................................. 5
  scenario 2 .................................. 5
  development trip plots .................... 5
  base year outcomes ....................... 5

2020 OUTCOMES – SENSITIVITY APPROACH 10
  KEY MESSAGEs .............................. 10
  morning peak – do minimum ............... 10
  morning peak – scenario 1 ............... 10
  morning peak – scenario 2 ............... 10

2025 OUTCOMES – SENSITIVITY APPROACH 14
  KEY MESSAGEs .............................. 14
  morning peak – do minimum ............... 14
  morning peak – scenario 1 ............... 14
  morning peak – scenario 2 ............... 14

Tables

Table 1 Residential Development Quantum ........ 4
Table 2 Employment Development (Jobs) ........... 4
Table 3 Total Vehicle Trip Generation ............. 5

Figures

Figure 1 Sensitivity Approach .......................... 4

Figure 2 2020 Sensitivity Demands ................... 6
Figure 3 2025 Sensitivity Demands ................... 7
Figure 5 2010 Base Line Assessment–Volume over Capacity Ratios ................. 9
Figure 6 2020 Sensitivity Demands – Do Minimum – Volume over Capacity Ratios .......... 11
Figure 7 2020 Sensitivity Demands – Scenario 1 – Volume over Capacity Ratios .......... 12
Figure 8 2020 Sensitivity Demands – Scenario 2 – Volume over Capacity Ratios .......... 13
Figure 9 2025 Sensitivity Demands – Do Minimum – Volume over Capacity Ratios .......... 15
Figure 10 2025 Sensitivity Demands – Scenario 1 – Volume over Capacity Ratios .......... 16
Figure 11 2025 Sensitivity Demands – Scenario 2 – Volume over Capacity Ratios .......... 17
Local Plan Proposals

DEVELOPMENT QUANTUMS

Tables 1 and 2 below provide the residential and employment forecasts from the proposed Darlington Local Plan through to 2030 compared to those within the Department for Transport (DfT) TEMPRO program.

TEMPRO has been provided as for business case purposes, guidance states that future year forecasts should be capped to TEMPRO growth.

In exceptional circumstances this guidance can be varied but this would require explanation and agreement of funding parties concern which introduces risk and potential for delay.

Table 1 Residential Development Quantum

<table>
<thead>
<tr>
<th>Source</th>
<th>2020</th>
<th>2025</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Darlington Local Plan</td>
<td>2915</td>
<td>5287</td>
<td>5717</td>
</tr>
<tr>
<td>TEMPRO v6.2</td>
<td>2052</td>
<td>3292</td>
<td>4417</td>
</tr>
<tr>
<td>Difference</td>
<td>863</td>
<td>1995</td>
<td>1300</td>
</tr>
</tbody>
</table>

Source: DBC, TEMPRO – Base Year 2014

As can be seen, the residential numbers are lower based on the 2014 TEMPRO base year. It is also clear that the local plan is being developed at a faster build out rate than assumed in TEMPRO.

Table 2 Employment Development (Jobs)

<table>
<thead>
<tr>
<th>Source</th>
<th>2020</th>
<th>2025</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Darlington Local Plan</td>
<td>6467</td>
<td>10491</td>
<td>13424</td>
</tr>
<tr>
<td>TEMPRO v6.2</td>
<td>610</td>
<td>1034</td>
<td>1237</td>
</tr>
<tr>
<td>Difference</td>
<td>5857</td>
<td>9457</td>
<td>12187</td>
</tr>
</tbody>
</table>

Source: DBC, TEMPRO, Jobs to Floorspace ratios from Employment Densities Guide 2010

The TEMPRO forecasts suggest little growth in employment in Darlington. The adoption of these forecasts within the TVU Regional Transport Model is accomplished through the phasing of developments beyond 2030.

It should also be noted that although the number of jobs increases in TEMPRO, the number of workers is forecast to decline due to demographic factors.

In addition, the TEMPRO forecast implies a growth of 2.5% in jobs by 2030, whereas the Darlington Local Plan implies around 27.5% growth in jobs.

SENSITIVITY TEST APPROACH

As a result of the differing employment numbers a revised forecasting process has been adopted called the Sensitivity tests in this report.

The approach is outlined in the figure to the right and is based on a standard transport assessment approach but applied to the entire local plan.
DEVELOPMENT TRIPS

The application of Highways England GraHAm trip rates to the Darlington Local Plan aspirations results in the following total number of additional vehicle trips per forecast year:

Table 3 Total Vehicle Trip Generation

<table>
<thead>
<tr>
<th>Source</th>
<th>2020</th>
<th>2025</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morning Peak</td>
<td>2405</td>
<td>4404</td>
<td>5504</td>
</tr>
<tr>
<td>% growth</td>
<td>8%</td>
<td>14%</td>
<td>18%</td>
</tr>
<tr>
<td>Evening Peak</td>
<td>2337</td>
<td>4290</td>
<td>5261</td>
</tr>
<tr>
<td>% growth</td>
<td>6%</td>
<td>12%</td>
<td>14%</td>
</tr>
</tbody>
</table>

Source: DBC, Percentage based on 2010 Darlington base trips

OUTCOMES ASSESSED

A variety of outcomes have been assessed as part of this commission. These include:

- Total road vehicle flows,
- Congestion indices such as volume over link capacity;
- Development trip flows;
- Car journey times;
- Public Transport Journey Times;
- Flow difference plots

OUTCOMES REPORTED IN THIS NOTE

The outcomes reported in this note are the development trip flows and the volume over link capacity ratios for the sensitivity analysis. These provide the key outcomes related to where future problems manifest and identify the requirements for potential mitigations.

DO MINIMUM

The do minimum represents the results through loading the forecast growth in trips onto the prevailing road network. Changes are assumed in terms of the cost of travel, i.e. fuel charges and the relative weightings of time and distance. These changes are in accordance with WebTAG guidance.

SCENARIO 1

Scenario 1 involves the introduction of the following schemes to the Do Minimum network:

- Darlington Eastern Growth Zone Link Road, (Morton Park – A1150);
- Edward Pease Way – Newton Lane;

SCENARIO 2

Scenario 2 involves the introduction of the following schemes to the Scenario 1 network:

- Faverdale Link (Rotary Way – Burtree Lane);
- Burtree Link (Burtree Lane – North Road);

DEVELOPMENT TRIP PLOTS

The following three plots illustrate the development trips for the morning peak of 2020, 2025 and 2030 respectively.

As can be seen, the largest levels of development trips are on the A66 corridor, specifically to access the south east sector of Darlington and the Durham / Tees Valley airport development

BASE YEAR OUTCOMES

Figure 5 presents the volume over capacity analysis for the 2010 forecast in the TVU model. This has been used as a reference point for changes in road conditions.
Figure 2 2020 Sensitivity Demands

Darlington MGP Area Action Plans
TVM Model Output
Figure R7A: 2020 - Sensitivity Demands - Reference Case Network Development Only Trips - Morning Peak

Line thickness depicts Link Flow Volume
Line colour depicts Volume Capacity Ratio as below
- Development only flows less than 50
- Development only flows between 50 and 100
- Development only flows more than 100

TVU Model
Figure 3 2025 Sensitivity Demands
Figure 4 2030 Sensitivity Demands
Figure 5 2010 Base Line Assessment–Volume over Capacity Ratios

Darlington MGP Area Action Plans
TVM Model Output
2010 - Existing Infrastructure Scenario

Link Volume to Capacity Ratios and Link Volumes

Line thickness depicts Link Flow Volume
Line colour depicts Volume Capacity Ratio as below
- Volume Capacity Ratio less than 0.85
- Volume Capacity Ratio between 0.85 and 1
- Volume Capacity Ratio greater than 1

TVU Model
2020 Outcomes – Sensitivity Approach

KEY MESSAGES

The traffic model demonstrates that the existing road network, together with access arrangements for development sites and improvements to the network in the immediate vicinity of developments can accommodate growth through to 2020.

MORNING PEAK – DO MINIMUM

Congestion increases on the Burtree Lane corridor as trips from West Auckland Road corridor to the north west of the town make use of Burtree Lane and Whessoe Road. This includes some vehicles from the A1(M) corridor accessing the A66 at Little Burdon using Burtree Lane and the A1150 in place of the congested A66.

Congestion on the A66 corridor between Arena and Morton Palms junction increases due to a 20% increase in vehicle flow.

The remaining issues represent worsening conditions and existing and known congested locations such as the radials to the town centre and the A67 Carmel Road corridor.

MORNING PEAK – SCENARIO 1

The introduction of the Eastern Road Link in 2020 provides access to developments and slight relief in road conditions to the east of the town.

The TRIPS model potentially overstates the local impact of the scheme due to limitations in the junction modelling, but the overall results presented here are in accordance with emerging work undertaken by Highways England on the measure.

The introduction of the West Park link reduces congestion on West Auckland Road by balancing traffic flows in the west of the town. More detailed analysis has been undertaken using the council’s Aimsun model on this corridor.

MORNING PEAK – SCENARIO 2

The opening of the Faverdale Link and Burtree Link have localised improvements to congestion on the Burtree Lane corridor.
Figure 6 2020 Sensitivity Demands – Do Minimum – Volume over Capacity Ratios

Darlington MIP Area Action Plans
TVM Model Output
Figure 6A: 2020 - Sensitivity Demands - Reference Case Network
Link Volume to Capacity Ratios and Link Volumes - Morning Peak

- Line thickness depicts Link Flow Volume
- Line colour depicts Volume Capacity Ratio as below:
  - Volume Capacity Ratio less than 0.85
  - Volume Capacity Ratio between 0.85 and 1
  - Volume Capacity Ratio greater than 1
Figure 7 2020 Sensitivity Demands – Scenario 1 – Volume over Capacity Ratios
Figure 8 2020 Sensitivity Demands – Scenario 2 – Volume over Capacity Ratios
2025 Outcomes – Sensitivity Approach

KEY MESSAGES

The traffic model indicates that, with the forecast traffic growth, levels of congestion increase across the road network at peak times. The introduction of additional road capacity and route choices (scenario 1 & 2 improvements) provides some relief on key routes including the A68 (A1M – Cockerton) and A66 (Morton Palms – A1150). Should traffic growth occur as predicted, to avoid increased congestion further traffic mitigation measures will need to be considered beyond the period of the emerging Local Plan (up to 2026) to enable full delivery of any additional developments.

MORNING PEAK – DO MINIMUM

There is a broad deterioration in road conditions, with this being illustrated through extensions of the sections exhibiting volume over capacity ratio’s of one.

The A67 East approach to the A66 at Morton Palms worsens but this is a function of the modelling seeking to balance flows from A66 Stockton corridor.

These issues are likely to manifest in additional queues at Little Burdon roundabout.

MORNING PEAK – SCENARIO 1

The introduction of the Eastern Link Road reduces the issues on the A66 corridor

The introduction of the Western Link provides some relief to West Auckland Road, but also increases the length of congested conditions towards the A1(M) junction. It is understood that the option of significantly reducing queue lengths through introducing a local left turn lane at the 168/Rotary Way junction has been identified within the Councils AIMSUN micro-simulation traffic model for this area.

This is explained by conditions improving on the A66 at Blands Corner junction, indicating that some A1(M) to west Darlington trips previously using Blands Corner and the A67 Carmel Road corridor are now routed via the A1(M) and West Auckland Road.

MORNING PEAK – SCENARIO 2

As for the 2020 assessment, the opening of the Faverdale and Burtree links have localised improvements to congestion on the Burtree Lane corridor.

In addition, modest relief is provided to the A1(M) J58 by providing an alternative route to access the West Auckland Road corridor.
Figure 9 2025 Sensitivity Demands – Do Minimum – Volume over Capacity Ratios

Darlington MSG Area Action Plans
TVM Model Output

Figure RSA: 2025 - Sensitivity Demands - Reference Case Network
Link Volume to Capacity Ratios and Link Volumes - Morning Peak

Line thickness depicts Link Flow Volume
Line colour depicts Volume Capacity Ratio as below:
- Volume Capacity Ratio less than 0.85
- Volume Capacity Ratio between 0.85 and 1
- Volume Capacity Ratio greater than 1
Figure 10 2025 Sensitivity Demands – Scenario 1 – Volume over Capacity Ratios
Figure 11 2025 Sensitivity Demands – Scenario 2 – Volume over Capacity Ratios