

**Crest Nicholson Developments  
Ltd**

**West of Bewbush**

**Summary of Further Technical  
Evidence Submitted to WSCC/HA  
Since July 2008**

**Project Ref: 16702/201**

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Peter Brett Associates LLP  
Caversham Bridge House  
Waterman Place  
Reading  
Berkshire  
RG1 8DN  
T: 0118 9500761  
F: 0118 9597498  
E: [reading@pba.co.uk](mailto:reading@pba.co.uk)



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## Document Control Sheet

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|--|-----------------|--------------------|-----------|------|
| <b>Prepared by:</b>                                    | James Brooke    | Assistant Engineer |           |      |
| <b>Reviewed by:</b>                                    | Sarah Matthews  | Senior Associate   |           |      |
| <b>Approved by:</b>                                    | Scott Witchalls | Partner            |           |      |
| <b>For and on behalf of Peter Brett Associates LLP</b> |                 |                    |           |      |

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## Contents

|          |   |          |
|----------|---|----------|
| <b>1</b> | <b>Introduction</b>                                     | <b>1</b> |
| <b>2</b> | <b>Report Structure</b>                                 | <b>2</b> |
| <b>3</b> | <b>Local Model Validation Report</b>                    | <b>3</b> |
| 3.1      | Introduction  | 3        |
| 3.2      | Data Collection   | 3        |
| 3.3      | Calbration and Validation                               | 3        |
| 3.4      | Summary   | 4        |
| <b>4</b> | <b>Detailed Junction Assessment Report</b>              | <b>5</b> |
| 4.1      | Introduction  | 5        |
| 4.2      | Assessment  | 5        |
| 4.3      | Results and Conclusions                                 | 5        |
| <b>5</b> | <b>Supplementary Report on the Relief Road</b>          | <b>6</b> |
| 5.1      | Background  | 6        |
| 5.2      | Model Tests   | 6        |
| 5.3      | Potential Effects of Induced Traffic                    | 7        |
| 5.4      | Affordability and Deliverability of a Relief Road       | 7        |
| 5.5      | Effects on a Relief road on Other Sustainable Proposals | 7        |
| 5.6      | Conclusions   | 7        |

## 1 Introduction

- 1.1.1. Peter Brett Associates (PBA) on behalf of Crest Nicholson Developments Ltd (CND) has been working with West Sussex County Council (WSCC) and the Highways Agency (HA) since late 2005 on transportation issues pertinent to development initiatives to the west and north west of Crawley.
- 1.1.2. Significant investment has allowed WSCC's Crawley Town Centre model (CTC) and the North East Sector model (NES) to be combined, extensively improved and extended to cover a wider geographical area. In May 2006, CND commissioned a wide range of surveys to be undertaken to provide information on car travel demand and patterns to form the basis for extending the model. This investment in the WSCC model has enabled future scenario testing for transport and development options at West and North West of Crawley.
- 1.1.3. The HA has developed in parallel a GATS model to assess the cumulative impact of development planned within the catchment area of the M23/A23 corridor. PBA has been working with the HA to ensure consistent and agreed methodologies are used to assess the development and to check that the models are providing compatible results.
- 1.1.4. A number of reports have been issued to WSCC and/or the HA since July 2008 in response to their queries and requests in order to seek agreement on:
  - the improvements and changes to the WSCC model;
  - the potential package of measures available to support development at West of Bewbush without a relief road;
  - the potential effects of a relief road; and
  - the compatibility of the GATS and WSCC models;

## 2 Report Structure

2.1.1. The following reports have been issued to WSCC and /or HA and are discussed in the section indicated:

- Section 3 - Local Model Validation Report
- Section 4 - Detailed Junction Assessment Report
- Section 5 - Supplementary Report on the Relief Road

2.1.2. These sections provide a summary of these large reports.

## 3 Local Model Validation Report

### 3.1 Introduction

3.1.1. PBA has developed WSCC's Crawley Town Centre model originally created by Scott Wilson, which comprised highway (SATURN) and PT (TRIPS) models and combined the highway only improvements carried out by WSP for the assessment of the north sector of Crawley Town improvements.

3.1.2. This report sets out the processes carried out to improve and extend the model, then calibrate and validate the base year highway model.

### 3.2 Data Collection

3.2.1. A significant amount of data has been collected for both the extension of the modelled networks and for model calibration / validation. This data includes:

- Network Inventory; (collected March 2006)
- Manual Classified Junction Turning Movement Counts (MCC) (May 2006)
- Automatic Traffic Counts (ATC) (May 2006)
- Registration plate Surveys (May 2006)
- Bus Route information
- Journey Times (May 2006)
- Road Side Interviews (RSI's) (May 2006)
- Network Building and Matrix Update

3.2.2. The report includes an updated account of the development of the 2005 Base Year model for the AM Peak (08:00-09:00) and PM Peak (17:00-18:00) hours.

### 3.3 Calibration and Validation

3.3.1. The acceptance criterion generally used is:

- The GEH 5 for individual flows should be less than; in at least 85% of cases.

*Note: The GEH Statistic is a formula used in traffic engineering, traffic forecasting, and traffic modelling to compare two sets of traffic volumes. Although its mathematical form is similar to a chi-squared test, it is not a true statistical test, it is an empirical formula that has been proven useful for a variety of traffic analysis purposes." The formula for*

*the "GEH Statistic" is:  $GEH = \sqrt{\frac{2(M-C)^2}{M+C}}$  where M is the modelled traffic flow and C is the observed traffic flow.*

3.3.2. The Link Flow statistic compared with observed flows are:

- For roads with flows of less than 700 vph modelled flows should be within 100 of the observations.
- For roads with flows of 700 to 2,700 vehicles per hour (vph) modelled flows should be within 15% of the observations.

## West of Bewbush

### Further Technical Evidence Submitted to WSCC/HA Since July 2008

- For roads with flows of more than 2,700 modelled flows should be within 400 of the observations.

3.3.3. The above criteria should be reached in 85% of all cases. This has been met with both the AM and PM models.

## 3.4 Summary

3.4.1. The calibration results for the two time periods have shown statistically a good fit between observed and modelled link flows. The model has been validated against independent counts and shows an acceptable fit when measured against the Acceptability Guidelines of Design Manual for Roads and Bridges (DMRB). It is contended and agreed with WSCC that the base model is fit for the purposes of the future year scheme assessments for west and north west of Crawley.

## 4 Detailed Junction Assessment Report

### 4.1 Introduction

4.1.1. This report summarises the assessment undertaken to confirm that junction improvements within land controlled by the developer, Highway Authority or Planning Authority can mitigate the impacts of development at West of Bewbush.

4.1.2. ARCADY, LINSIG and TRANSYT junction assessment software has been used to test the following junctions:

- Site access junction
- A23/A2220 junction (or Cheal's Roundabout)
- M23 Junction 11
- A264/Sullivan Drive junction

### 4.2 Assessment

4.2.1. Three different scenarios have been tested for each junction.

- using the traffic flows directly output from the WSCC model assessment summarised within the Addendum Report (and NOT considering the further benefits of travel planning)
- using WSCC 'capped and adjusted' methodology supplied within a spreadsheet (Note: M23 Junction 11 not tested with these traffic flows)
- adding development trips directly to the 2022 without development base flows. This does not therefore consider the effects of reassignment and modeshift of existing trips due to the introduction of the junction improvements and new/improved bus and Fastway services, i.e. a worse case.

### 4.3 Results and Conclusions

4.3.1. The assessment shows that, in their improved forms, all junctions operate within capacity or with significantly lower delay than in the 2022 without development. It is demonstrated that even if NO consideration is given to the effects of the proposed transport package on existing trips in Crawley (which is known and assessed to be unrealistic), the improved junctions will operate within capacity or with significantly lower delay than in 2022 without development. Travel Planning and a railway station would further reduce the need for such improvements.

4.3.2. The report demonstrates that the impact of development traffic can be more than mitigated by the identified junction improvements which are considered deliverable in that they lie within the bounds of the existing public highway, land within control of Crest or Local Authority land.

## 5 Supplementary Report on the Relief Road

### 5.1 Background

5.1.1. This report summarises the reassignment effects of a relief road and considers the potential effects of new road building. The report discusses in detail the following:

- The model tests
- Potential effects of a Relief Road
- Affordability and deliverability of a Relief Road
- Effects on a Relief Road on Other Sustainable Proposals

5.1.2. The scenarios which have been tested provide a direct comparison to the HA model tests to ensure the compatibility of the HA's GATS4 model and the WSCC model.

### 5.2 Model Tests

5.2.1. The model is not currently capable of determining the level of induced traffic which might occur at Crawley with the introduction of a Relief Road. The model therefore only shows the reassignment that might occur if a Relief Road was introduced. The model tests show that:

- When comparing the results and plots of forecast traffic flow with the relief road and with the package of measures proposed in the 3<sup>rd</sup> Draft TA and Addendum Report (option C), the Relief Road could potentially lead to increased traffic flows on the A23 of 6% in the AM, but a reduction in flows of 20% in the PM. This disregards the potential that the Relief Road will attract induced traffic. (It should be noted that the aim of the proposed transport package at West of Bewbush is not to relieve the A23, but to provide and encourage sustainable travel as a priority. The proposed junction improvements assist this strategy with new pedestrian and cycle crossing points and bus priority as well as providing additional capacity for the residual car trips made to/from the development.)
- The change in traffic flows on the M23 is less significant with the introduction of a Relief Road, with an approximate reduction of only 2-3% in the AM and PM peak periods.
- The operations of the M23 junctions do not appear to benefit from the introduction of a Relief Road.
- Induced traffic could substantially increase the forecast traffic levels on the A23, which may remove the benefits.
- The Relief Road results in increases in traffic flows to the north and south particularly at Forest Road, Bonnetts Lane, London Road, Fleming Way, Horley Road, Langley Drive and Ifield Drive.
- Only 14-20% of development traffic will use the Relief Road, therefore 80-86% of traffic using the Relief Road will be non-development traffic, discounting induced traffic growth.
- The introduction of a Relief Road also shows there to be significantly more car trips to and from the development, and fewer bus and rail trips, than development plus Option A or C.

### 5.3 Potential Effects of Induced Traffic

- 5.3.1. Much research provides evidence that new roads attract induced traffic. This is traffic which is not currently on the highway during the assessed peak hours. SACTRA (1994) concluded that an average road improvement, for which traffic growth due to all other factors is forecast correctly, will see an additional (i.e. induced) 10% of base traffic flows in the short term and 20% in the long term.
- 5.3.2. The model is not currently capable of determining the level of induced traffic which might occur at Crawley with the introduction of a Relief Road.
- 5.3.3. Further work is required to determine the need for a Relief Road to support further development West of Crawley. If induced traffic reached similar levels to other highway schemes, it is likely that no relief would be apparent on either the M23 or A23 in the long term.
- 5.3.4. None the less, our assessment would be that the delivery of a Relief Road may result in short term benefits. However in the longer term, these benefits may be lost following the effects of induced traffic and traffic growth, and may potentially reach a stage where there are greater levels of traffic along the 'relieved' roads than before the Relief Road was delivered.

### 5.4 Affordability and Deliverability of a Relief Road

- 5.4.1. No studies into the deliverability of the Relief Road have been undertaken to date nor is the proposal included within the emerging South East Plan. The routes identified to date extend through many land ownerships, through flood plains, through or close to areas of environmental significance, and will likely cause visual impact.
- 5.4.2. It is likely that the construction of a road on the western fringes of the site would be contrary to Core Strategy policy CP6 in terms of maintaining a visual separation between Horsham and Crawley and ensuring the strategic gap is maintained. The technical evidence submitted in July 2008 by Crest Nicholson with regard to landscape shows that the development proposal as presented in the JAAP (i.e. with no relief road) will have no adverse impact on landscape factors and the adjacent AONB.

### 5.5 Effects on a Relief road on Other Sustainable Proposals

- 5.5.1. The development West of Crawley will not able to invest in both sustainable infrastructure and service improvements and a Relief Road.
- 5.5.2. Policy requires that priority should be given to investment in a sustainable package of transport improvements prior to building new roads. Due to its increased attractiveness to car drivers a Relief Road would undermine the potential to travel by sustainable means.
- 5.5.3. The implementation of a Relief Road would also make it less likely that a business case could be made for a new railway station at West Bewbush.
- 5.5.4. The model tests show that more trips are made by car rather than by bus or rail if a Relief Road is implemented. Induced traffic would further reduce the attractiveness of the conventional bus services by increasing delay to them. There is therefore likely to be a greater shift to the car with the implementation of a Relief Road.

### 5.6 Conclusions

- 5.6.1. The Transport Assessment and Addendum Report confirm that the proposed package of measures, listed below, will mitigate the impacts of the development at West of Bewbush and encourage sustainable travel. The identified package is deliverable and in accordance with the PPS12 tests of soundness. The proposals offer significant improvement to travel within

## West of Bewbush

### Further Technical Evidence Submitted to WSCC/HA Since July 2008

the Crawley area even after the introduction of the complete development. The package of measures includes:

- Junction improvements at M23 junction 11.
- Improvements at A23/A2220.
- Potential Junction improvements at the A264/Sullivan Drive roundabout.
- Provide a new site highway access with demand management to better manage traffic flow from the site. Land for a future Relief Road is also safeguarded.
- Secondary access junction to provide vehicle access during the early stages of development and for emergency access only in the long term. The bus gates at Ifield West and into Bewbush will also provide further emergency access points.
- Fastway service 10 extended into the site with enhancement of frequency to 7-8 minutes to deliver segregated public transport access to key destinations such as Crawley centre and Gatwick Airport.
- Extension of service 200 into the site with enhanced frequency to every 20 minutes to deliver a direct link to Manor Royal and Gatwick Airport.
- Additional service 201 (similar service to 200 but operates via Ifield West rather than Bewbush) frequency every 30 minutes required to deliver improved services at Ifield West and a direct link to Manor Royal and Gatwick Airport.
- Divert service 23/24 through the site to deliver public transport connections to Horsham.
- Three access points for buses, a bus gate at Sullivan Drive (Bewbush), a bus gate at Woodcroft Road (Ifield West), and via the junction on the A264 to provide bus segregation and priority access.
- Three railway crossings; the first for pedestrians and cyclists, the second for pedestrians, cyclists, buses and emergency vehicles and access and the third for all modes to reduce the perception of severance caused by the railway line and to allow integration with Bewbush and Ifield West.
- Potential for a railway station to encourage more sustainable travel to/from the development and the local communities at Bewbush and Ifield West.
- Direct foot and cycle access to/from Ifield West, Bewbush; Kilnwood Lane to Faygate; and rural areas to the north, west and south (to the AONB) to integrate well with the existing communities and provide access to new facilities and open space.

5.6.2. The proposals above provide the sustainable infrastructure, off-site highway improvements and safeguarded land to enable future development and a Relief Road to be delivered. Any future development will then be able to invest in the Relief Road infrastructure, if required.