

Post Opening Project Evaluation

M27 Junction 3-4 Widening



Five Years After Study
October 2015

Notice

This document and its contents have been prepared and are intended solely for the Highways England's information and use in relation to the Post Opening Project Evaluation of Major Schemes.

Atkins assumes no responsibility to any other party in respect of or arising out of or in connection with this document and/or its contents.

Table of contents

| Chapter | Pages |
|--|-----------|
| Executive Summary | 4 |
| 1. Introduction | 6 |
| Background | 6 |
| Scheme Context | 6 |
| Other Schemes in the Vicinity | 9 |
| Post Opening Project Evaluation (POPE) | 9 |
| Key Findings from One Year After Study | 9 |
| Report Structure | 10 |
| 2. Traffic Impact Evaluation | 11 |
| Introduction | 11 |
| Data Sources | 11 |
| Background Changes in Traffic | 11 |
| Traffic Volume Analysis | 14 |
| Forecast vs. Outturn Traffic Flows | 19 |
| Journey Time Analysis | 21 |
| Journey Time Reliability | 24 |
| 3. Safety Evaluation | 27 |
| | 27 |
| Introduction | 27 |
| Data Sources | 27 |
| Collision Numbers | 30 |
| Fatalities & Weighted Injuries | 35 |
| Collision Locations | 36 |
| Forecast vs. Outturn Collision Numbers | 36 |
| Collision Rates – Key Links | 37 |
| Security | 38 |
| 4. Economy | 40 |
| Introduction | 40 |
| Forecast Benefits | 40 |
| Present Value Benefits (PVB) | 41 |
| Journey Time Benefits | 41 |
| Vehicle Operating Costs (VOC) | 42 |
| Safety Benefits | 42 |
| Scheme costs | 43 |
| Indirect Tax Revenues | 43 |
| Present Value Costs (PVC) | 44 |
| Benefit to Cost Ratio (BCR) | 45 |

Post Opening Project Evaluation
M27 Junction 3 to 4 Widening – Five Years After Opening Study

| | |
|--|-----------|
| Wider Economic Impacts | 45 |
| 5. Environment | 47 |
| Introduction | 47 |
| Traffic Forecast Evaluation | 50 |
| Five Years After Assessment | 51 |
| Noise | 51 |
| Local Air Quality | 53 |
| Greenhouse Gases | 54 |
| Landscape | 55 |
| Heritage of Historic Resources | 60 |
| Biodiversity | 61 |
| Water Quality and Drainage | 63 |
| Physical Fitness | 65 |
| Journey Ambience | 66 |
| 6. Accessibility and Integration | 70 |
| Accessibility | 70 |
| Option Values | 70 |
| Severance | 70 |
| Access to the Transport System | 70 |
| Integration | 71 |
| Transport Interchange | 71 |
| Land Use Policy | 71 |
| Other Government Policies | 72 |
| 7. Appraisal Summary Table & Evaluation Summary Table | 75 |
| Appraisal Summary Table | 75 |
| Evaluation Summary Table | 75 |
| 8. Conclusions | 78 |
| Scheme Specific Objectives | 78 |
| Appendices | 79 |
| Appendix A. Tables and Figures in this Report | 80 |
| Appendix B. Data requested for Section 5: Environment | 82 |
| Appendix C. ES and OYA Comparison Viewpoints | 83 |
| Appendix D. Glossary | 95 |

Executive Summary

Scheme Description

The M27 Junction 3 to 4 widening scheme opened in January 2009. This was a Highways England Major Scheme to widen approximately 2.9 miles (4.6 km) of the M27 between junctions 3 & 4 near Southampton. The number of lanes was increased from three to four in each direction.

Heavy goods vehicles and traffic changing lanes associated with the two junctions and the motorway service area were identified as factors contributing to the disruption of traffic on the main carriageway leading to congestion and unreliable journey times. The purpose of the scheme was to improve journey times and improve safety for all road users, thereby providing more reliable journey times.

Scheme Objectives

| Objective (Source: Environmental Statement) | Objective Achieved? |
|--|---------------------|
| To provide additional capacity and reduce congestion. | ✓ |
| To improve safety. | ✗ |
| To give improved and more reliable journey times. | ✓ |
| Achieve no significant worsening of the previous environmental assessments and improve on them where possible. | ✓ |

Key Findings

- Traffic volumes using the scheme have been lower than forecast and this was primarily due to overestimation of background traffic growth in the original appraisal forecasts, and the impacts of the economic downturn reducing traffic flows.
- Journey times in the AM Peak eastbound direction and PM peak westbound direction along the scheme length are shorter at Five Years After opening than they were before the scheme. However AM peak westbound direction and PM peak eastbound direction journey times are slightly longer.
- The scheme has had a moderate beneficial effect on journey time reliability.
- The forecast safety benefit has not materialised based on five years of post-opening data.
- Monetary benefits of the scheme have been lower than predicted due to lower than expected journey time benefits. This is because traffic volumes have been lower than forecast. Costs of the scheme were broadly in line with forecast, and the outturn Benefit Cost Ratio (BCR) is lower than forecast.

Summary of Scheme Impacts

Traffic

- The traffic on the M27 between J3 and J4 where the carriageway has been widened from three to four lanes increased by 3% at Five Years After Opening compared to pre-scheme. This represents about 4,200 additional vehicles per weekday.
- Traffic on other motorway sections in the scheme vicinity has also seen increases in traffic compared to pre-scheme (0 to 5%).
- Changes in the hourly traffic trend indicated that the scheme has attracted more traffic in the morning and evening peak periods when the pre-scheme congestion levels were high enough for some traffic to choose alternate routes.
- The level of traffic forecast along the scheme section was overestimated as this assumed background growth in traffic whereas the observed changes in traffic nationally and regionally has shown little change in traffic.
- The extra traffic due to the scheme (i.e. in addition to background growth) was predicted relatively accurately.
- Large journey time savings are observed in the AM peak eastbound direction and PM peak westbound direction. There appears to be a slight increase in journey time in the AM peak westbound direction and PM peak eastbound direction.

- The scheme has had a moderate beneficial effect on journey time reliability in line with that forecast in the appraisal and the route stress has reduced from 91% in the pre-scheme to 76% post opening.

Safety

- The annual average number of collisions on the scheme key links, i.e. M27 J3-4, has seen an increase of 1.7 collisions per annum over what would have been expected having accounted for the background trend in collision reduction. This is not a statistically significant change.
- Post opening collision rates along the scheme section show no observable change when compared to pre-scheme counterfactual rate.
- The forecast safety benefit has not materialised based on five years of post-opening data.

Environment

- Based on lower than expected heavy goods vehicle numbers observed at the five year after opening stage, it likely that Noise and Air Quality are better than expected.
- Tree and shrub planting undertaken as a part of the scheme indicates that the visual screening and landscape integration functions of the mitigation measures are not developing as expected. It is concluded that the intended functions of integration, screening and habitat enhancement will not be fully realised by the Design Year for this scheme without active maintenance/management.
- The Environment Statement required that potential long-term impacts (> 15 years) on reptiles would be linked to cutting/management by the highway Managing Agents. It is noted that maintenance of grassland required for reptile habitat within the scheme is not being maintained as advised in the ES. Invasive species, especially thistles and gorse are threatening to overrun areas of planting if left uncontrolled. The landscape management plan states that species such as gorse, sycamore, ash, poplar and willow should be controlled.
- The impact of the scheme on water quality and biodiversity is considered as expected.

Accessibility and Integration

- The scheme's impact on the Option Values, Severance and Access to the Transport System sub-objectives of neutral is consistent in the forecast and the outturn evaluation.
- This scheme is compatible with regional and national transport policies and most local policies.

Summary of Scheme Economic Performance

| All monetary figures in 2002 Prices and values | Forecast (£m) | Outturn Re-forecast (£m) |
|---|---------------|--------------------------|
| Journey Times | 320.8 | 100.3 |
| Vehicle Operating Costs | -2.5 | -0.9 |
| Safety | 37.5 | 0.0 |
| Total Present Value of Benefits (PVB) | 355.8 | 99.4 |
| Investment Cost | 30.1 | 28.3 |
| Indirect Tax | -5.6 | -2.0 |
| Total Present Value of Costs (PVC) | 24.5 | 26.3 |
| Benefit Cost Ratio (BCR)-Indirect Tax as Cost | 14.5 | 3.8 |
| Benefit Cost Ratio (BCR)-Indirect Tax as Benefit | 12.0 | 3.6 |

- The outturn assessment of the scheme benefits is £99.4m, lower than predicted. This is due to lower than expected journey time savings (as a result of lower than forecast traffic volumes).
- The outturn investment cost is 8% lower than forecast.
- The outturn BCR of 3.6 is lower than forecast due to the lower than expected benefits accrued. However the scheme still represents high value for money.

1. Introduction

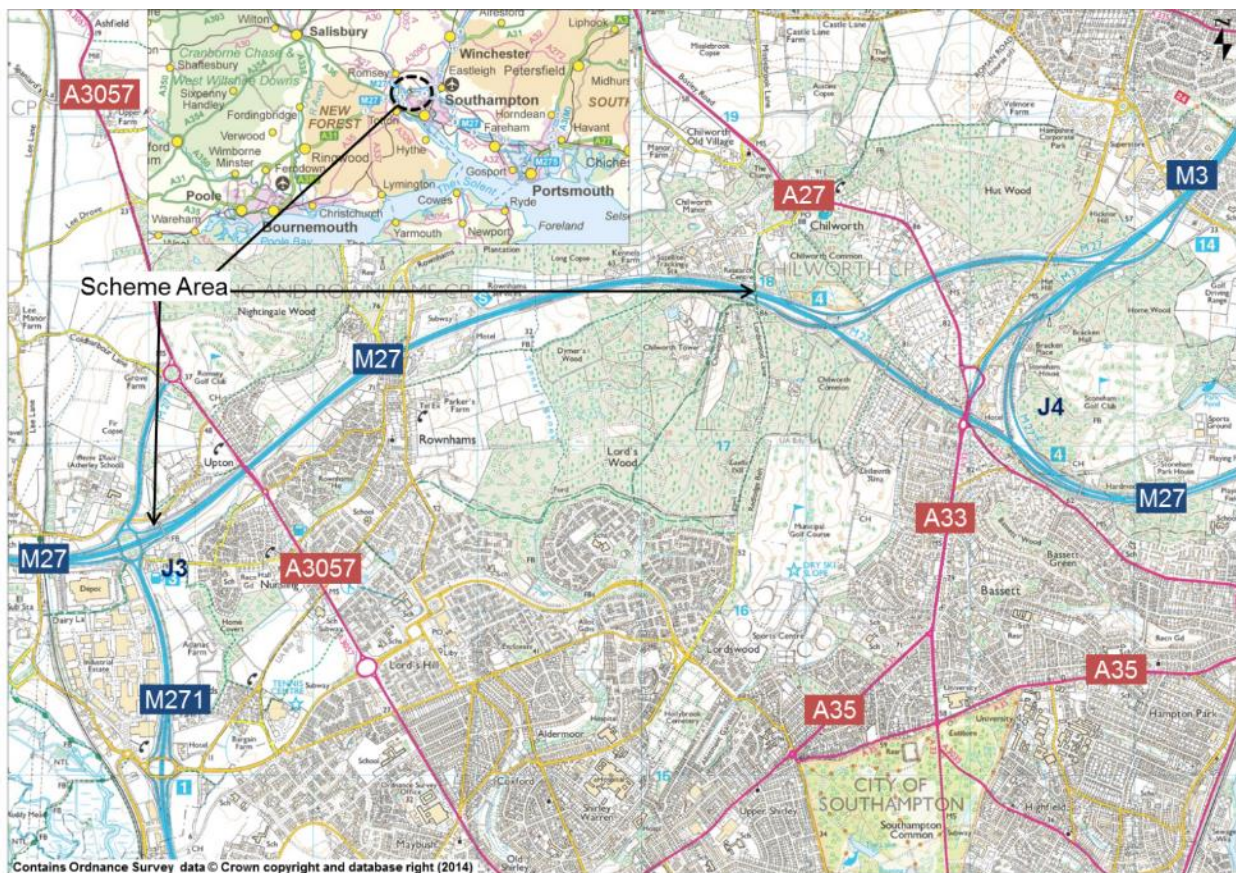
Background

- 1.1 This report is the Five Years After (FYA) post opening study of the **M27 Junction 3 to 4 Widening** scheme which opened on 30th January 2009. The evaluation has been prepared as part of Highways England’s (formerly known as the Highways Agency (HA)) Post Opening Project Evaluation (POPE) programme. POPE is undertaken one year and five years after the opening of all major schemes.
- 1.2 The purpose of the POPE FYA study is to evaluate whether the original objectives of the scheme have been achieved, and to provide a comparison of predicted and actual scheme impacts. The study presents an evaluation of the scheme’s impact on five objectives; economy, safety, environment, accessibility and integration.

Scheme Context

- 1.3 The M27 is a strategic route between Portsmouth and Southampton, and forms part of the Trans-European Road Network (TERN) along the south coast of England. At junction 3, the M27 is joined by the M271 serving Southampton docks and industrial sites along Southampton Water, while junction 4 is a free-flow interchange with the M3, leading towards London. This section is thus heavily used by traffic (including heavy goods vehicles) between Southampton docks and the London area. There is a Motorway Service Area (MSA) midway along the link. The location of the scheme and its context within the road network is shown below in **Figure 1-1**.

Figure 1-1 – Location of the M27 Junction 3-4 Widening Scheme



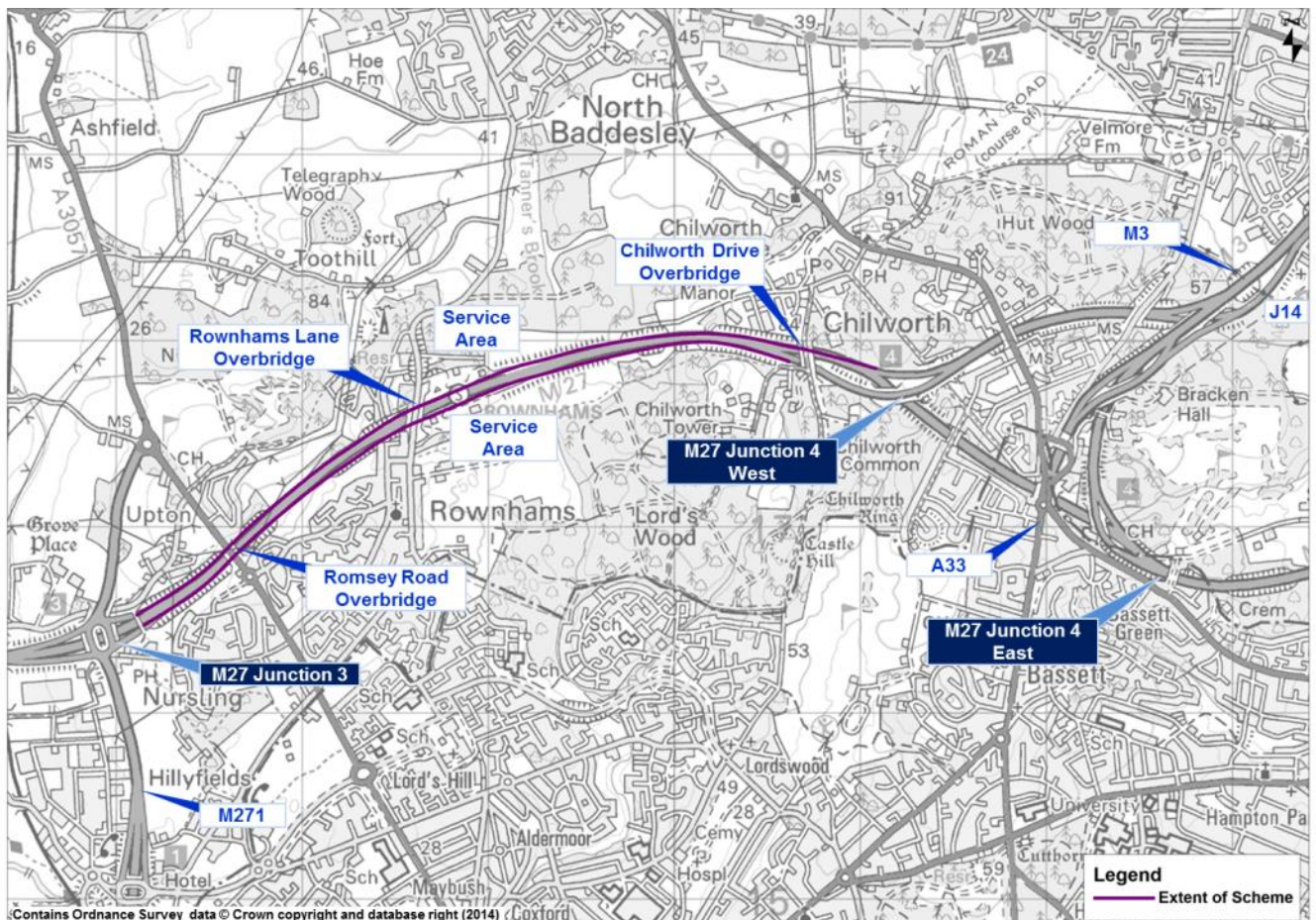
Scheme Objectives

- 1.4 The scheme objectives listed below are taken from the Environmental Statement (ES – November 2006) and the Non-Technical Summary (NTS). The objectives were to:
- **Provide additional capacity and reduce congestion (ES & NTS);**
 - **Improve safety (ES & NTS);**
 - **Give improved and more reliable journey times (NTS); and**
 - **Achieve no significant worsening of the previous environmental assessments, and improve on them where possible (ES).**

Scheme Description

- 1.5 Prior to the improvements, this link was of three lane standard and the smooth flow of traffic was disrupted by the numerous lane-changing movements associated with the junctions and the Motorway Service Area. To address these issues, the scheme involved widening the entire link to four lanes in each direction. This has been achieved within the existing highway boundary by providing narrow lanes (3.45 metres) and a hard shoulder (3.00 metres). The hard shoulder has been eliminated at bridges and near the service area to enable continuous four lane running.
- 1.6 Proposals to introduce variable speed limits, and to extend motorway lighting, were not implemented in a late change confirmed by the Highways England project manager at the OYA reporting stage. As a result, the number of superspan gantries required for signing was reduced. The impact of this on the environmental evaluation is considered further in **Chapter 5** of this report.
- 1.7 The scheme falls within Highways England Area 3 and within the administrative area of Hampshire County Council.
- 1.8 The scheme layout is illustrated in **Figure 1-2** and has been labelled to indicate the key features. The figure clearly demonstrates the extent of the scheme and the proximity of the scheme to major routes on the M3 and M271.

Figure 1-2 – Key Features of the M27 Junction 3-4 Widening Scheme



History of the Scheme

1.9 The Appraisal Summary Table (AST) for this scheme states that the problems that led to the scheme implementation were ‘severe congestion and delay and high accident occurrence’. The timeline for the scheme’s development is illustrated in **Table 1-1**.

Table 1-1 – Chronology of the M27 Junction 3-4 Widening Scheme

| Date | Event |
|---------------|---|
| December 2000 | Widening recommended in M27 Portsmouth/Southampton Corridor Study |
| August 2002 | Widening recommended in South Coast Multi-Modal Study |
| March 2005 | Scheme entered Targeted Programme of Improvements (now known as Programme of Major Schemes) |
| November 2005 | Scheme Public Exhibition |
| February 2007 | Scheme Public Inquiry |
| February 2008 | Construction started |
| January 2009 | Scheme opened |
| November 2010 | One Year After study published |

Other Schemes in the Vicinity

- 1.10 Other schemes in the vicinity of the scheme can sometimes have an impact on traffic flows, journey time or collisions. In this case, improvements at M27 Junction 3 started in October 2014 and should be complete by March 2015. This work is part of Highways England's Pinch Point programme. The justification for this junction improvement work is due to the significant congestion and delays experienced by traffic using the M27 westbound exit slip road and M271 northbound and southbound approaches during peak periods. It is also noted that the delays on the westbound exit slip road affect traffic on the M27 mainline. Whilst the construction works are outside of the period considered in this report (in terms of traffic flows and safety), the problems it aims to fix may have impacted journey times and safety for this scheme. Where applicable, this is considered further in the relevant sections throughout this report.

Post Opening Project Evaluation (POPE)

- 1.11 Highways England is responsible for improving the strategic highway network (motorways and trunk roads) by delivering the Major Schemes programme. At each key decision stage through the planning process, schemes are subject to a rigorous appraisal process to provide a justification for the project's continued development.
- 1.12 When submitting a proposal for a major transport scheme, the Department for Transport (DfT) specifies that an Appraisal Summary Table (AST) is produced which records the degree to which the DfT's objectives for transport¹ have been achieved. The contents of the AST allow judgements to be made about the overall value for money of the scheme. The AST for this scheme is presented in **Table 7-1** on page 76.
- 1.13 POPE studies are carried out for all Major Schemes to evaluate the strengths and weaknesses in the techniques used for appraising schemes. This is vital so that improvements can be made in the future. For POPE, this is achieved by comparing information collected before and after the opening of the scheme to traffic, against predictions made during the planning process. The outturn impacts of a scheme are summarised in an Evaluation Summary Table (EST) which summarises the extent to which the objectives of a scheme have been achieved. The EST for this scheme can be found in **Table 7-2** on page 77.
- 1.14 POPE of Major Schemes goes beyond monitoring progress against targets set beforehand. Instead, it provides the opportunity to study which aspects of the intervention and appraisal tools used to evaluate it are performing better or worse than expected, and how they can be made more effective. More specifically the objectives of POPE evaluation reports are as follows:
- Provide a quantitative and qualitative analysis of scheme impacts consistent with national transport appraisal guidance (WebTAG) and scheme specific objectives.
 - Identify discrepancies between forecast and outturn impacts.
 - Explain differences between forecast and outturn impacts.
 - Identify key issues relating to appraisal methods that will assist Highways England in ongoing improvement of appraisal approaches and tools used for major schemes.

Key Findings from One Year After Study

- 1.15 The purpose of the FYA study is to verify and study in more detail the emerging trends and conclusions presented in the OYA study report. The main conclusions made in the M27 J3-4 Widening OYA report were as follows:
- Traffic flows were predicted to increase as a result of the scheme. Observed flows on the scheme section remained largely unchanged while the flows on local A-roads had decreased a little.
 - There had been a substantial improvement to journey times following scheme opening. This was observed through all months of the year and all hours of the day. The reduction appeared consistent in the eastbound and westbound carriageways.

¹ As of August 2011, this approach has been revised. However, POPE is concerned with evaluation against the appraisal and as such follows the objectives used at that time.

- There was much less variation in journey times throughout the day following the scheme; the long journey times in the peak period were almost completely eradicated post-scheme opening. This and the fact that route stress had decreased 23% implied an improvement in reliability.
- The annual average number of collisions reduced from 24.6 per year to 19. However it remained within the range of numbers of collisions occurring in the five years before scheme construction, and the change was not statistically significant.
- The predicted collision reduction was almost twice that actually achieved. This was mainly due to the COBA default collision rates used for the Do Something not being representative of the scheme link, although this is acknowledged in the appraisal assumptions.
- The outturn cost was £26.7 million, at 2002 prices, 10% lower than predicted (£29.6m).
- Impacts of the scheme were largely as expected, however for noise, air quality and greenhouse gases impacts were likely to be better than expected.

1.16 Overall, it was concluded that the following scheme objectives were met:

- To provide additional capacity and reduce congestion.
- To give improved and more reliable journey times.
- Achieve no significant worsening of the previous environmental assessments and improve on them where possible.

1.17 It was noted in the OYA report that it was too early to assess the objective to improve safety.

Report Structure

1.18 The remainder of this report is structured as follows:

- **Chapter 2** – Traffic Impact Evaluation.
- **Chapter 3** – Safety.
- **Chapter 4** – Economy.
- **Chapter 5** – Environment.
- **Chapter 6** – Accessibility and Integration.
- **Chapter 7** – Appraisal Summary Table and Evaluation Summary Table.
- **Chapter 8** – Conclusions.

1.19 There are also a number of appendices listed below as follows:

- **Appendix A** – Tables and Figures in this Report.
- **Appendix B** – Data requested for Section 5: Environment.
- **Appendix C** – ES and OYA Comparison Viewpoints.
- **Appendix D** – Glossary.

2. Traffic Impact Evaluation

Introduction

- 2.1 This section examines traffic data from a number of sources to provide a before and five years after opening comparison of traffic flows and journey times on the scheme section and other roads in the vicinity of the scheme. The purpose of this evaluation is to understand whether changes in traffic flows and journey times may be attributable to the scheme.
- 2.2 This section comprises:
- A summary of the sources used to compile data for this evaluation.
 - A description of national, regional and local background traffic trends to provide context against which observed changes in actual traffic can be considered.
 - A detailed comparison of before, one year after and five years after traffic flows on key routes in the study area likely to be affected by the scheme to provide context against which observed changes in actual traffic can be considered.
 - An evaluation of key differences between forecast and outturn impacts of the scheme in terms of traffic flows and journey times to identify whether traffic flow changes were as expected or otherwise.

Data Sources

- 2.3 This section of the report uses data from several sources to inform the “before” and “after” analysis of changes in traffic volumes and journey times on key routes that may be attributable to the scheme.

Forecast Data

- 2.4 Forecast traffic data used for the forecasts is provided in the following reports:
- M27 J3-4 Widening Local Model Validation Report (June 2006); and
 - M27 Junctions 3-4 Widening Forecasting Report (October 2006)

Observed Data

- 2.5 Observed traffic and journey time data has been taken from the sources as detailed below:

Traffic Count Data

- Permanent count data obtained from the TRADS² database for count locations on Highways England’s network.

Journey Time Data

- Journey times along the M27 between junction 3 and 4 have been extracted from Highways England’s Journey Time Database (JTDB). The JTDB contains average journey times and average speeds for each junction to junction link on Highways England’s core network.

Background Changes in Traffic

- 2.6 Historically in POPE scheme evaluations, the ‘before’ counts have often been factored to take account of background traffic growth so that they are directly comparable with the ‘after’ counts. This usually involves the use of National Road Traffic Forecasts (NRTF), with local adjustments made using National Transport Model (NTM) Local Growth Factors.

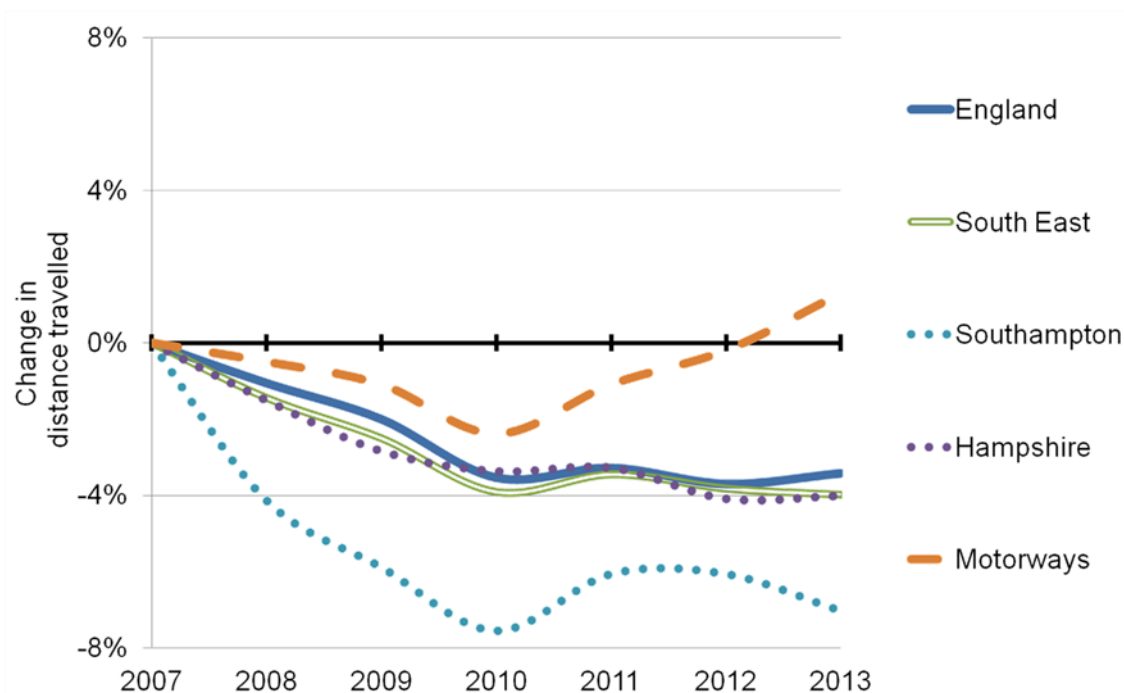
² TRADS is the Highways England website containing traffic flow data from automatic traffic counts on the Highways England’s strategic network.

2.7 However, in light of the recent economic climate, which has seen widespread reductions in motor vehicle travel in the United Kingdom (UK) as a whole since 2008, it is no longer deemed appropriate to use this method of factoring ‘before’ counts to reflect background changes in traffic. Rather, recent POPE studies have taken a more considered approach in order to assess changes in the vicinity of the scheme, within the context of national, regional and locally observed background changes in traffic.

National, Regional and Local Trends

2.8 The Department for Transport (DfT) produces observed annual statistics for all motor vehicles by local authority³. Data between 2007 (before start of construction) and 2013 (the latest available) is shown in million vehicle kilometres (mvkm) for Hampshire, Southampton, the South East and England in **Figure 2-1**. The DfT also produces observed annual vehicle kilometres travelled by road type and road management in England⁴.

Figure 2-1 – National, Regional and Local Traffic Trends



2.9 The following points can be made from **Figure 2-1**:

- Traffic trends are broadly similar at a national and regional level, with a decline in vehicle kilometres travelled from 2007 to 2010 and then a marginal increase in 2011 and remaining constant through to 2013.
- Traffic trends in Hampshire followed a similar trend to national and regional trends and the overall decrease between 2007 and 2013 is 4%.
- Traffic flows in Southampton have reduced by the largest proportion since 2007. There has been a 7% decrease in vehicle kilometres driven in Southampton between 2007 and 2013.
- Between 2007 and 2010 traffic volumes on motorways have shown a similar pattern of traffic decrease, although to a less extent than the national and regional trend. This is followed by an increase in traffic from 2011 onwards. The overall net increase observed between 2007 and 2013 is 1%.

³ Motor vehicle traffic (vehicle kilometres) by local authority in Great Britain, annual from 1993 to 2013. Table TRA8904 (Department for Transport).

⁴ Motor vehicle traffic (vehicle kilometres) and road length by road type and road management in England, annual from 1993. Table TRA4112 (Department for Transport).

M27 Growth Trends

- 2.10 The remainder of this section explores the changes that have occurred since the opening of the scheme, and attempts to establish to what degree the changes can be attributed to the scheme. It is therefore fitting to establish how the M27 motorway fits within this wider context of background traffic changes. **Table 2-1** shows the flow trend for motorway links around the scheme observed between 2007 and 2013 and the locations of these count sites are shown in **Figure 2-2**.

Figure 2-2 – Location of Long Term Trend Count Sites

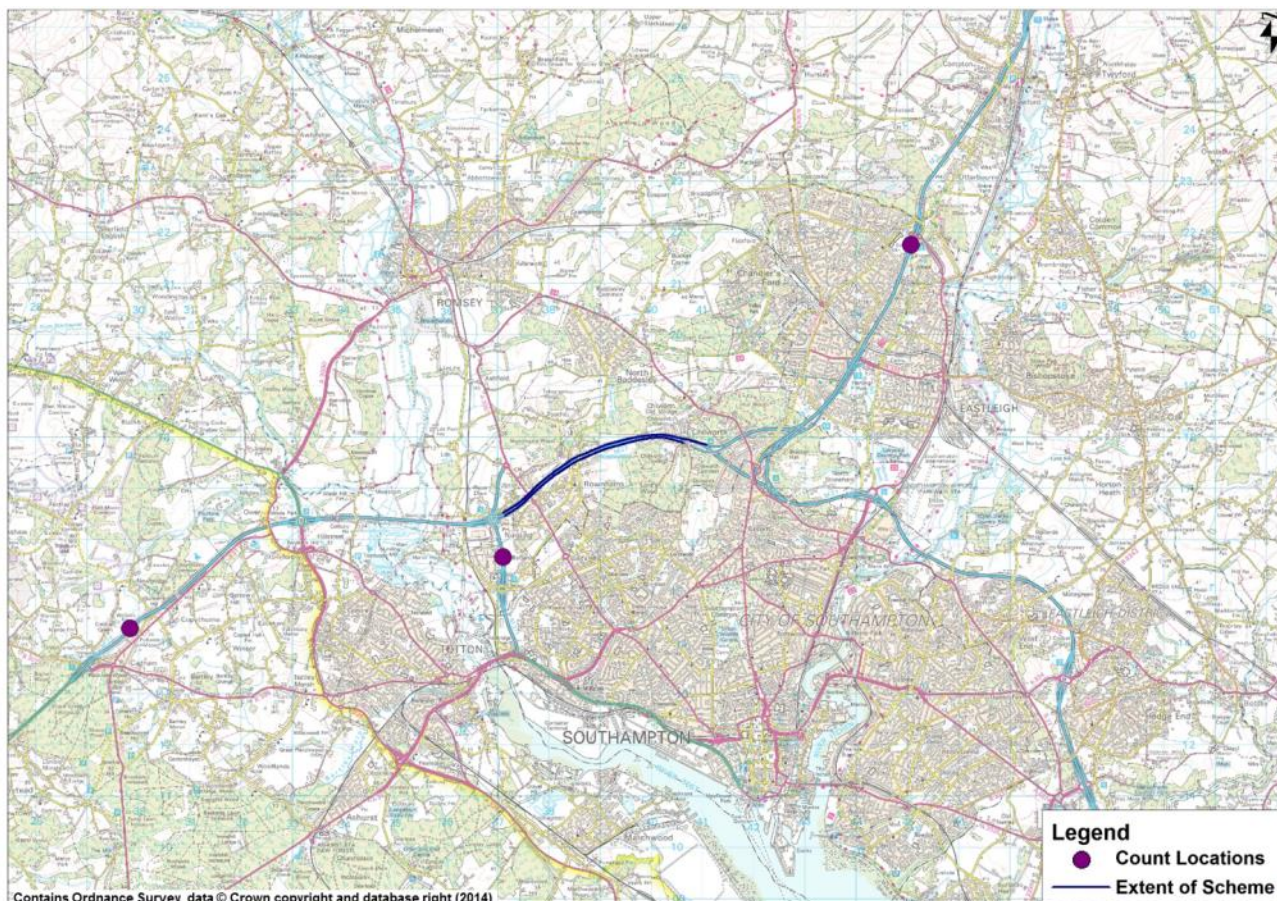


Table 2-1 – Long Term Trends in AAWT on Motorway links around the scheme

| Year | M3 J11-12 | | M271 J1 - M27 J3 | | M27 J1-2 | |
|------|-----------|--------------------------|------------------|--------------------------|----------|--------------------------|
| | AAWT | Factor of change on 2007 | AAWT | Factor of change on 2007 | AAWT | Factor of change on 2007 |
| 2007 | 127,800 | 1.00 | 58,500 | 1.00 | 77,200 | 1.00 |
| 2008 | 126,900 | 0.99 | 54,800 | 0.94 | 74,400 | 0.96 |
| 2009 | 127,500 | 1.00 | 57,700 | 0.99 | 75,000 | 0.97 |
| 2010 | 127,100 | 0.99 | 58,700 | 1.00 | 75,500 | 0.98 |
| 2011 | 128,400 | 1.01 | 59,200 | 1.01 | 76,600 | 0.99 |
| 2012 | 126,800 | 0.99 | 59,100 | 1.01 | 73,900 | 0.96 |
| 2013 | 127,900 | 1.00 | 59,900 | 1.02 | 75,500 | 0.98 |

All figures are to nearest 100. Factors are calculated according to un-rounded counts

- 2.11 It can be seen from **Table 2-1** that traffic levels on motorway links around the scheme have experienced relatively small changes between 2007 and 2013. Flows on the M271 between J1 and the M27 have increased slightly since 2007 (2%). The M27 J1-2 to the west of the scheme has seen a small (2%) reduction in traffic since 2007. This decrease is not as high as seen detailed in the local, regional and national trends seen in **Figure 2-1**. These figures suggest that

the motorways follow the national trends seen for motorways (no change/slight increase) rather than regional trends. The M27 west of the scheme may be more affected by regional trends, with a small decrease seen, although not to the levels shown for Hampshire/Southampton.

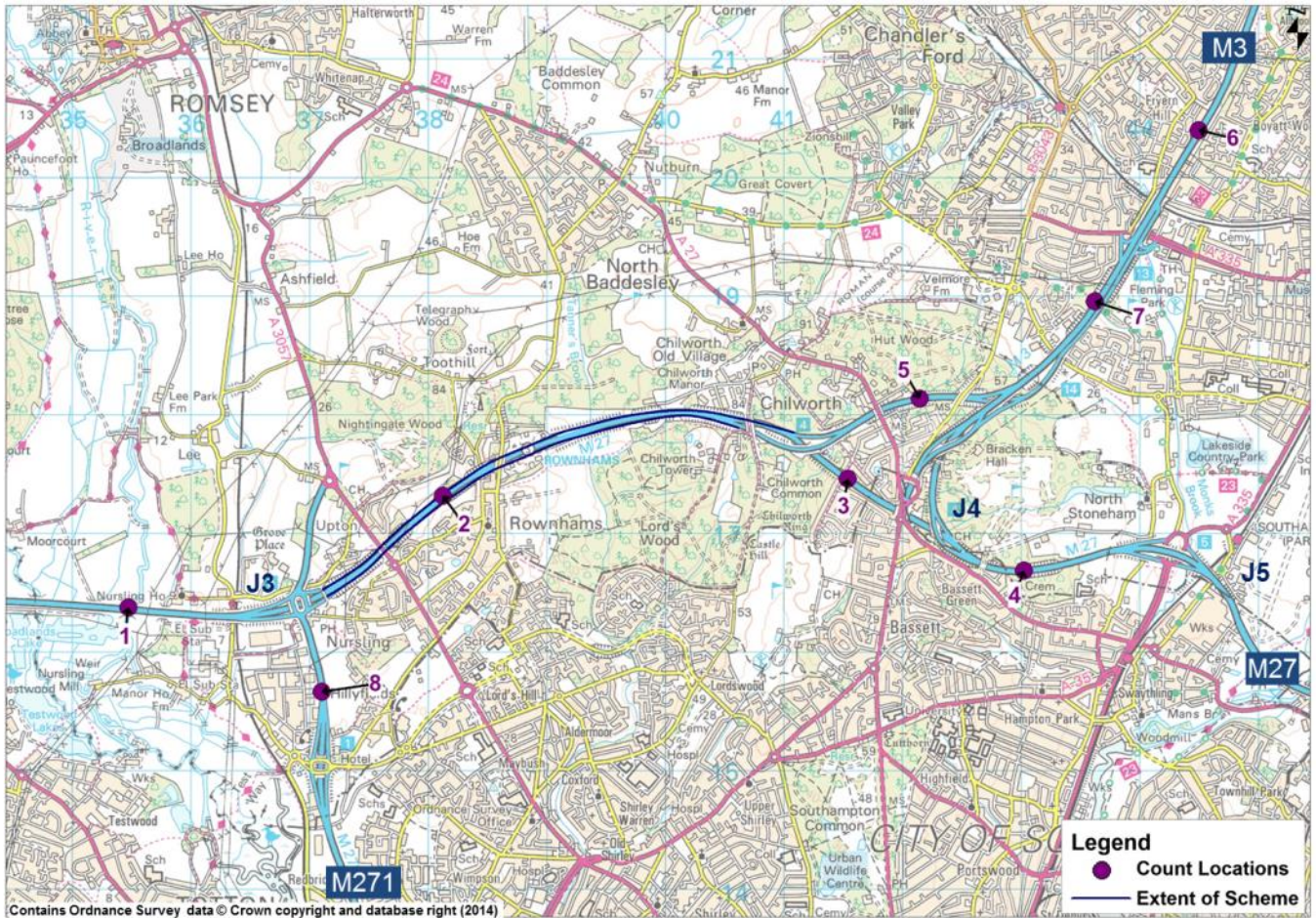
Conclusions on Background Growth

- 2.12 This section has considered a number of issues which may have influenced observed traffic flows pre-scheme and post-opening.
- 2.13 Based on the information presented in this section, it has been considered that no annual growth factors should be applied to the data presented in this report. Rather, when reading this report it is important to keep in mind that at the OYA stage a general decrease in traffic flows was likely, coinciding with the economic recession. However, at this FYA stage, traffic flows are generally static when compared to pre scheme levels.

Traffic Volume Analysis

- 2.14 The changes between pre-scheme and post-opening traffic flows on all key roads in the vicinity of the M27 scheme section are now considered in the context of the wider traffic trends, in order to assess the scheme's impact on traffic patterns.
- 2.15 Data obtained from the TRADS database for count locations on Highways England network has been used to inform the before and after analysis of changes in traffic volumes. To complete this evaluation, data from before construction (March 2007), OYA, (March 2010) and FYA (March 2014) is compared.
- 2.16 The locations of the traffic count data sources used in this evaluation are shown in **Figure 2-3**.

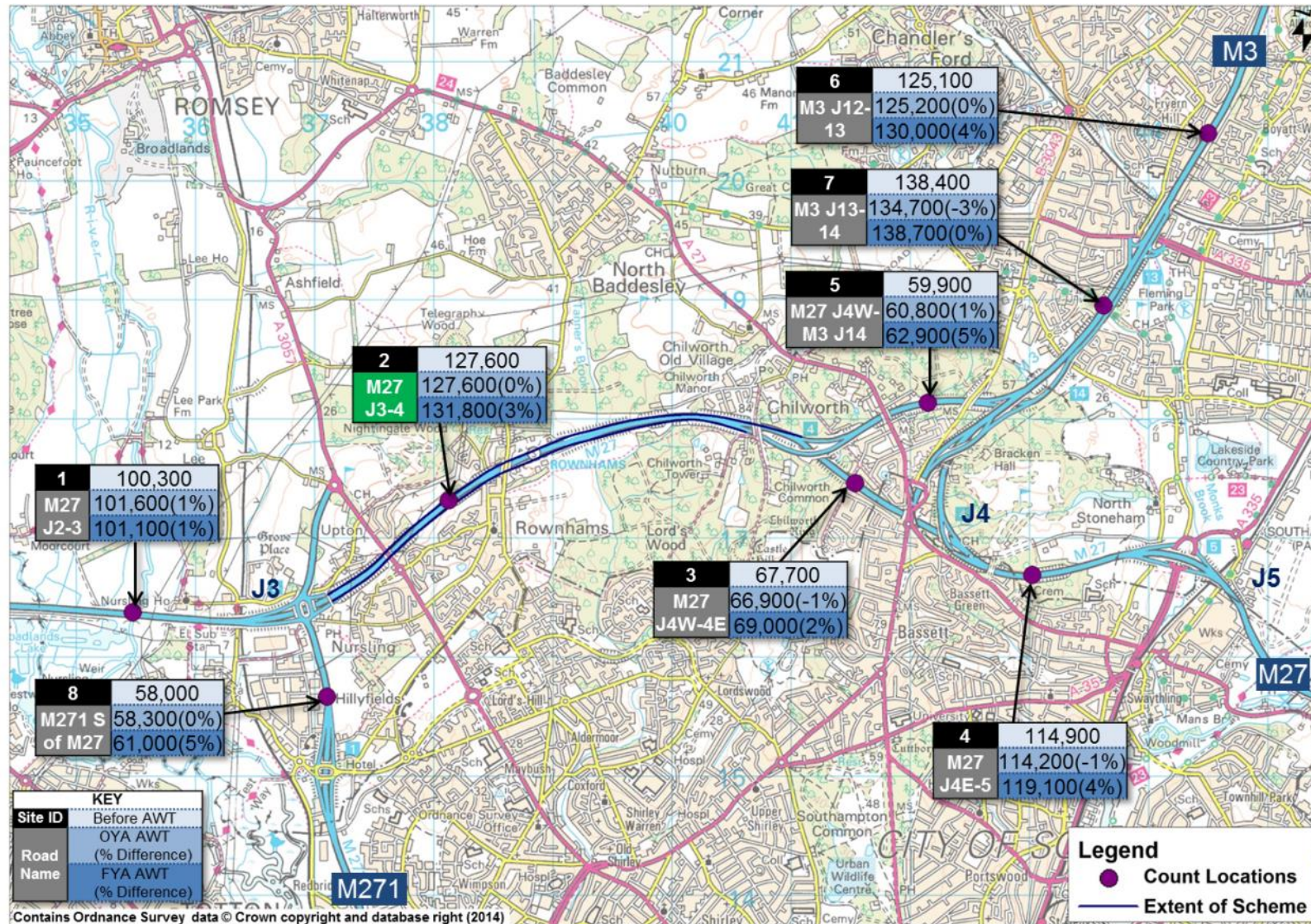
Figure 2-3 – Location of Count Sites



Observed Flows

- 2.17 A comparison of pre-scheme and post-opening 24-hour Average Weekday Traffic (AWT) flows along the scheme section and in the vicinity is presented in **Figure 2-4**.

Figure 2-4 – Comparison of Pre-scheme and Post-opening AWT on and around the scheme



2.18 The following observations regarding changes in Average Weekday Traffic (AWT) on the scheme section and other roads in the study area can be made:

- Traffic volumes on the scheme section have increased by 3% at FYA compared to pre-scheme and this equates to about 4,200 additional vehicles per weekday compared to pre-scheme. While at OYA, the traffic was same as pre-scheme levels.
- There has been growth of a similar magnitude south of the scheme section on the M271 and North of the scheme section on the M27 J4W to M3 J14 and the change at FYA compared to pre-scheme is 5% for both these sections.
- West of the scheme section on the M27 between J2 and J3, traffic levels have remained the same as OYA, but still marginally higher than the pre-scheme levels by 1%. This suggests that there has been little change along this section following the implementation of the scheme.
- Sections east of the scheme section on the M27 between J4W to J4E and J4E to J5 have seen an increase of 2% and 4% respectively and this is higher than the growth seen at OYA.
- Along the M3 between J13 to J14, traffic has increased slightly compared to pre-scheme.
- Traffic along the M3 between J12 and J13 has grown more significantly than the rest of the north section with an additional 4,900 vehicles per average weekday at FYA compared to pre-scheme.

2.19 All sections have seen an increase in traffic at FYA since the OYA stage with the exception being the M27 west of the scheme section where little change is observed. At OYA, traffic volumes had reduced marginally at all locations. According to the DfT Statistics discussed in **section 2.9**, traffic levels in the years between OYA and FYA on motorways increased nationally by 2%, and that on all roads in Southampton and Hampshire has decreased by 1%. Hence it is likely that the additional capacity created by the scheme has encouraged this growth along the scheme section, as well as following motorway trends rather than local trends.

Heavy Goods Vehicles (HGV)

The M27 falls within the abnormal grid route which designates certain routes as suitable for abnormal loads; one of the problems identified at this location that necessitated the scheme was the high proportion of HGVs. In particular, the M271/M27/M3 movement in both directions is high due to the strategic importance of this section as an access route to Southampton Port.

Table 2-2 shows a comparison for the proportion of vehicles greater than 6.6m in length. This has been used as a proxy for HGV measurements as data is available on a like-for-like basis in 2007 and 2014. Classified count data available has been obtained from the Highways England TRADS database and presented in the table below for the M27 section widened by the scheme.

Table 2-2 – Number and Proportion of HGVs on an average weekday (AWT)

| Map ref | Description | Before (2007) | FYA (2014) | % Change |
|---------|-------------------|-------------------|-------------------|----------|
| 2 | M27 J3-4 (scheme) | 15,900 (12.5%) | 16,900 (12.8%) | 6% |

2.20 **Table 2-2** – indicates that:

- At the FYA stage there is a marginal increase in the number of heavy vehicles on the scheme section which may be associated with the additional capacity created by the widening making the M27 a more desirable route for HGV traffic. The change at FYA compared to pre-scheme is 6%.

2.21 This indicates that the increase in traffic observed post opening along the scheme section is a mix of light vehicles and HGVs.

Hourly Distribution of Flows on the M27

2.22 The hourly distribution of flows across the day can be useful to determine the nature of peak flows on a particular link, and whether for instance peak spreading or contracting is occurring.

2.23 The following figures present the hourly profile of traffic throughout an average weekday, before, one year after opening and five years after opening for the scheme section. The dotted line represents % change between FYA and before hourly flows.

Figure 2-5 – Change in Average Weekday Hourly Flows on M27 J3-4 Eastbound

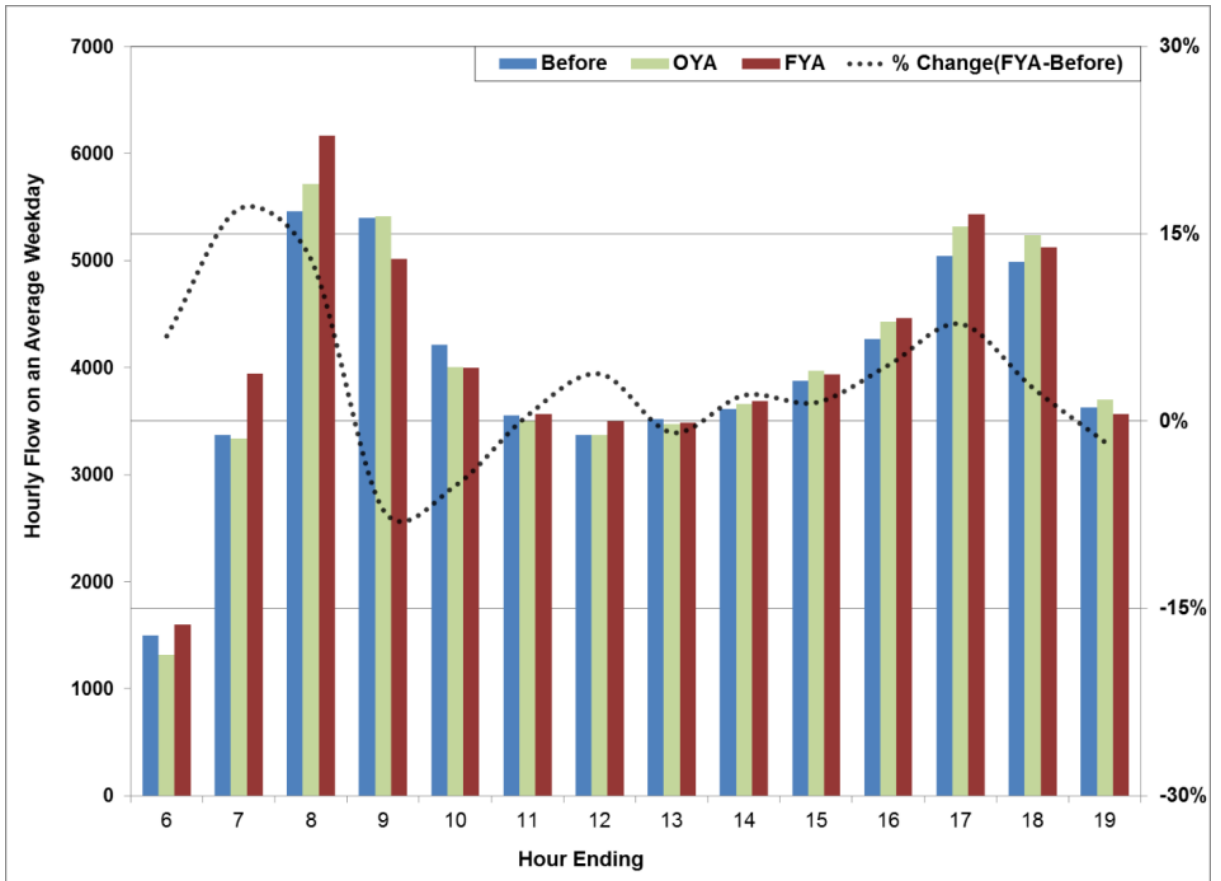
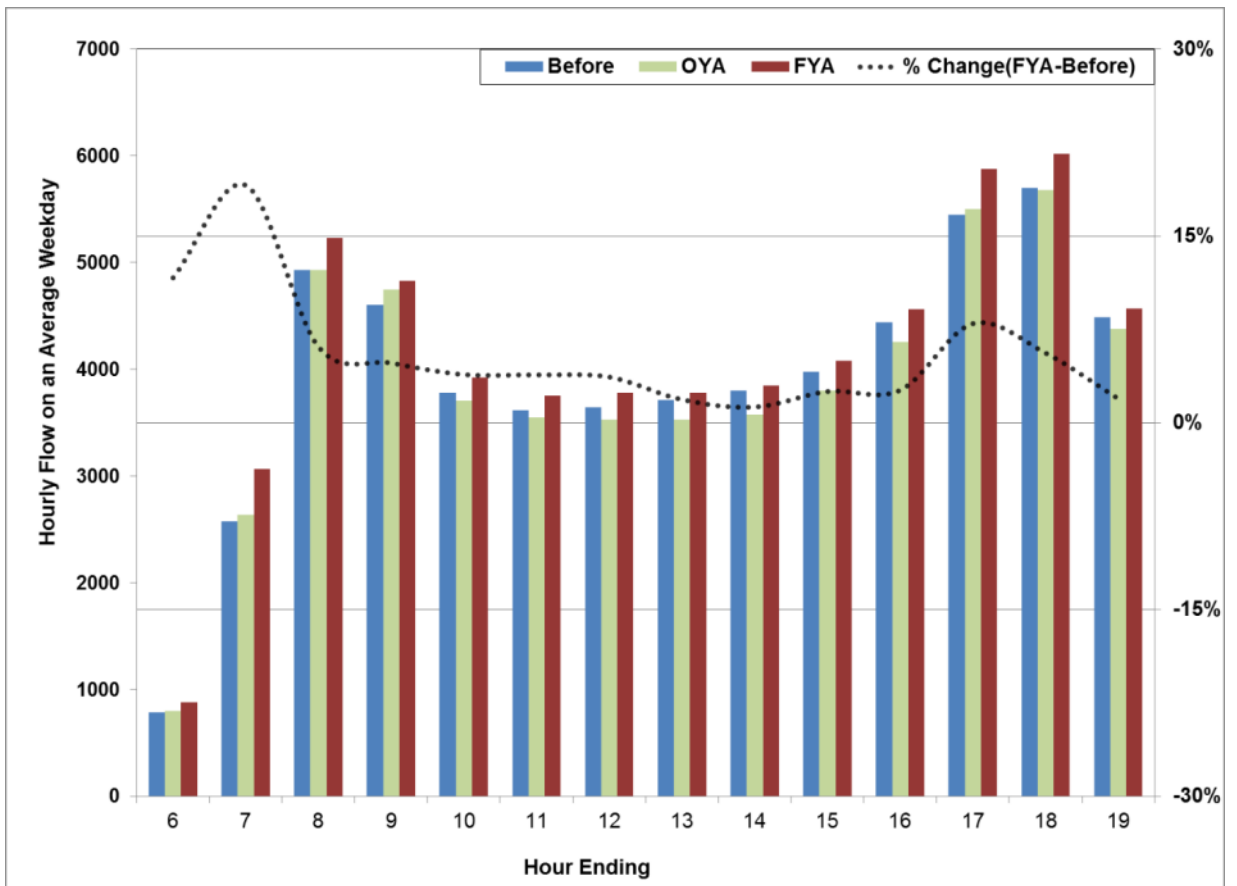


Figure 2-6 – Change in Average Weekday Hourly Flows on M27 J3-4 Westbound



- 2.24 The following conclusions can be drawn from **Figure 2-5** and **Figure 2.6**:
- Traffic growth which has occurred on the M27 scheme section post opening has been strongly focussed during the AM and PM peak period with slight increases in flow occurring in the interpeak period.
 - The average increase in flow during the 12 hour period (07:00-19:00) in the eastbound direction is 2% and in the westbound direction is 4%.
- 2.25 From the daily traffic trend discussed in **Section 2.18** and the hourly profile, it can be concluded that the scheme has attracted more traffic in the morning and evening peak periods when the pre scheme congestion levels were high enough for some traffic to choose alternate routes, or not to travel at all. Since congestion is less of an issue in the off peak period, traffic levels have remained the same. This increase in traffic along the scheme can be considered against a slight reduction in background traffic, demonstrating the increased attractiveness of the M27 corridor as a result of the additional capacity provided by the scheme.

Forecast vs. Outturn Traffic Flows

- 2.26 The M27 J3-4 widening was justified based on an appraisal of impacts carried out in October 2006. POPE methodology reassesses modelled forecast flows with observed traffic volumes to ascertain the accuracy of the predictions.

Traffic Modelling Approach and Forecast Assumptions

- 2.27 Before undertaking an evaluation of the forecast traffic impacts compared to those which have actually occurred, it is first necessary to develop an understanding of how the scheme has been appraised and the key assumptions used. This may then assist in explaining any potential differences between the traffic forecasts and the observed impacts.
- 2.28 The appraisal of this scheme was based on the M27 Integrated Transport Study (ITS) SATURN model. The base year 2000 model was updated to 2004 to incorporate the changes in network and travel patterns.
- 2.29 The following years were used for the forecasts:
- 2009- Opening year.
 - 2016-7 years after opening.
 - 2024- 15 years after opening.
 - 2031- Last TEMPRO forecast year.
- 2.30 The following time periods were modelled:
- AM peak hour – 08:00-09:00.
 - Inter peak hour – Average 10:00-16:00.
 - PM peak hour – 17:00-18:00.
- 2.31 The model covered the whole length of the M27, extending from the A31 East of Ringwood (east) to the A259 East of Havant (west).
- 2.32 The Do-Minimum network comprised of future highway schemes of strategic importance due to the strategic purpose of the M27 Highway model and this included the M27 J11-J12 Climbing lane scheme and M275 widening (Portsmouth) from 3 to 4 lanes. In the absence of detailed scheme designs for the M27 J11/J12 widening scheme and M275 widening, a simple one lane-widening scheme was assumed for each part of the network. It had been assumed that both schemes were in place for 2009 and so has been included in all forecast year runs.
- 2.33 The Do-Something scenario consisted of the Do-Minimum network and the M27 J3-4 widening scheme.
- 2.34 The forecast growth rates were considered from NTEM (National Trip End Model) adjusted by local TEMPRO (v4.3) factors and NRTF (97) (National Road Traffic Forecasts, 1997).
- 2.35 The modelling of the reference case showed that with the scheme it was forecast that there would be higher traffic levels.

- 2.36 The M27 SATURN model was a highway only model and the impacts of the change in travel cost and resultant effect on travel demand were assessed through the use of elasticity techniques applied within the SATURN assignment based on the guidance at the time of forecast for light vehicles. Using this, a new suppressed demand matrix was estimated which represented a more realistic level of travel demand.
- 2.37 From the forecast SATURN variable demand model it was anticipated that the introduction of the scheme would have a limited impact on induced traffic. It was identified that bottlenecks exist upstream and downstream of the scheme with other areas of the network experiencing severe congestion affecting the impact of the scheme in inducing traffic. It was also anticipated that the increase in traffic flows along the scheme section as a result of the scheme (DS-DM flows) could be below the increase in road capacity as a result of the congestion in other parts of the network reducing the growth achievable in the area.

Forecasts vs. Observed Traffic Flows

- 2.38 Forecast traffic flows (AADT) are provided in the M27 Junctions 3 – 4 Widening Forecasting Report (October 2006). According to the model, traffic on the M27 was predicted to increase with the scheme, although it gives no reason for this increase other than being '*due to the increase in network capacity brought about by the M27 J3 – 4 widening scheme*'.
- 2.39 Flows are available for the years 2004 (base year), 2009 and 2024 (Do-Minimum (DM) and Do-Something (DS)). Observed flows are available for 2007 (before) and 2014(FYA). HGV forecasts are considered in the Environment section of this report.
- 2.40 The observed ADTs for 2007 and 2014 have been compared with the forecast flows without any factoring⁵. These forecasts are inclusive of expected background traffic growth at the time of appraisal. **Table 2-3** provides the forecast and observed traffic flow.

Table 2-3 – Forecast vs. Observed Traffic Flows, Two Way AADT

| Location | Forecast | | Observed | | Difference | |
|----------------------|----------|---------|-------------|----------|------------------------------|----------------------------------|
| | DM-2007 | DS-2014 | Before-2007 | FYA-2014 | Forecast (DS 2014 – DM 2007) | Observed (FYA 2014- Before 2007) |
| M27 J2-3 | 104,200 | 118,900 | 94,900 | 96,600 | 14,700 (14.1%) | 1,700 (1.7%) |
| M27 J3-4 (scheme) | 126,000 | 144,000 | 119,200 | 125,800 | 18,000 (14.3%) | 6,600 (5.5%) |
| M27 J4W-4E | 68,000 | 76,400 | 62,200 | 63,700 | 8,400 (12.3%) | 1,500 (2.4%) |
| M27 J4-5 | 116,600 | 125,800 | 105,600 | 110,200 | 9,200 (7.9%) | 4,600 (4.4%) |
| M27 J4W-M3 J14 | 57,900 | 66,100 | 57,000 | 59,900 | 8,200 (14.2%) | 2,900 (5.1%) |
| M3 J12-13 | 127,500 | 136,600 | 117,200 | 122,600 | 9,100 (7.2%) | 5,400 (4.6%) |
| M271 S of M27 | 52,400 | 57,700 | 52,500 | 55,700 | 5,300 (10.2%) | 3,200 (6.1%) |

- 2.41 It can be seen from Table 2 3 that flows were forecast to increase at all locations. The growth along the scheme section was expected to be 14.3% and this is about 18,000 additional vehicles on an average day, whereas the observed change between 2007 and 2014 is 5.5% (6,600 vehicles per day). Also the 2007 DM forecast flows were slightly higher than observed pre-scheme flows indicating that the model was slightly inaccurate in representing the pre-scheme conditions.
- 2.42 As shown earlier in this chapter, traffic growth has generally been static since the scheme opened, and therefore in order to consider the accuracy of forecast traffic flows as a direct result

⁵ Observed traffic is March 2007 and 2014 ADT. The TRADS data is not complete for before and after to allow for a robust AADT calculation. Hence March ADT being a neutral month is considered instead of AADT.

of the scheme (ie without accounting for any background traffic growth), forecast DM 2014 flows have been calculated by interpolating between DM 2009 and DM 2024 flows and forecast DS 2014 flows calculated by interpolating between DS 2009 and DS 2024 flows. These are shown in Table 2-4.

Table 2-4 – Forecast vs. Observed Traffic Flows (no traffic growth), Two Way AADT

| Location | Forecast | | Observed | | Difference | |
|----------------------|----------|---------|-------------|----------|------------------------------|----------------------------------|
| | DM-2014 | DS-2014 | Before-2007 | FYA-2014 | Forecast (DS 2014 – DM 2014) | Observed (FYA 2014- Before 2007) |
| M27 J2-3 | 114,900 | 118,900 | 94,900 | 96,600 | 4,000 (3.5%) | 1,700 (1.7%) |
| M27 J3-4 (scheme) | 135,300 | 144,000 | 119,200 | 125,800 | 8,700 (6.5%) | 6,600 (5.5%) |
| M27 J4W-4E | 73,300 | 76,400 | 62,200 | 63,700 | 3,100 (4.3%) | 1,500 (2.4%) |
| M27 J4-5 | 124,300 | 125,800 | 105,600 | 110,200 | 1,500 (1.2%) | 4,600 (4.4%) |
| M27 J4W-M3 J14 | 62,900 | 66,100 | 57,000 | 59,900 | 3,200 (5.1%) | 2,900 (5.1%) |
| M3 J12-13 | 136,200 | 136,600 | 117,200 | 122,600 | 400 (0.3%) | 5,400 (4.6%) |
| M271 S of M27 | 56,000 | 57,700 | 52,500 | 55,700 | 1,700 (3.0%) | 3,200 (6.1%) |

- 2.43 Where the effect of background growth is not considered, i.e. the difference in the number of vehicles with and without the scheme in the year 2014, the growth was expected to be 6.5%. This indicates that as a result of the scheme 8,700 additional vehicles were forecast on an average day due to increased capacity of the scheme section. This aligns with the observed traffic growth along the scheme section between 2007 and 2014 of 5.5% (6,600) even against a background reduction in traffic.
- 2.44 The forecast traffic is close to observed traffic for the scheme section and the adjoining sections when only the impact of the scheme is considered (ie no traffic growth). However observed traffic counts along M27 J4-5, M3 J12-13 and M271 south of M27 is higher than forecast traffic. This indicates that the forecast underestimated the traffic impacts on these sections North and South of the scheme, or considered that other network constraints would have reduced the impact on a wider area.
- 2.45 Taking all of the above into account, it is considered that the forecast impacts of the scheme were reasonably accurate. The forecast had anticipated considerable background traffic growth along with increased traffic due to the capacity increase brought about by the scheme. In reality, background traffic volumes have remained relatively unchanged and hence the increase in traffic seen can be attributed to the scheme as shown by Table 2.4 where the forecast and observed difference is smaller.

Journey Time Analysis

Scheme Objective: to give improved and more reliable journey times

- 2.46 This section considers the impact on journey times following the scheme's implementation. Pre-scheme journey times along the scheme section are compared with post-opening journey times for both directions. The journey time analysis is split into three components:
- Analysis of pre and post-scheme journey time differences along the scheme.
 - A comparison of forecast and outturn journey times along the scheme.

- A comparison of journey time reliability pre-scheme and post-opening.
- 2.47 The journey time periods assessed align with the modelled journey times in the Traffic Forecasting Report, and are as follows:
- Weekdays AM peak (08:00 to 09:00).
 - Weekdays inter-peak period (10:00 to 16:00).
 - Weekdays PM peak (17:00 to 18:00).
 - Average (07:00-19:00)
- 2.48 The calendar periods used in this FYA study are:
- Before: January 2007 to December 2007
 - OYA: February 2009 to January 2010
 - FYA: February 2013 to January 2014

Observed Journey Times

- 2.49 Observed journey times have been taken from Highways England’s Journey Time Database (JTDB). This section will analyse the journey time results along the M27 J3-J4 scheme section. **Table 2-5** gives pre-scheme and post-opening journey times by direction along the scheme section and the observed savings in journey time.

Table 2-5 – Average Journey times and savings on the M27 J3-J4 (seconds)

| Direction | Time Period | Before | OYA | FYA | Savings at FYA | % Change (FYA-Before) |
|-----------|-----------------|--------|-----|-----|----------------|-----------------------|
| Eastbound | AM | 232 | 186 | 201 | 32 | 14% |
| | IP | 165 | 164 | 164 | 1 | 1% |
| | PM | 211 | 183 | 214 | -2 | -1% |
| | Average 12 hour | 189 | 171 | 179 | 10 | 6% |
| Westbound | AM | 176 | 146 | 191 | -16 | -9% |
| | IP | 139 | 137 | 135 | 4 | 3% |
| | PM | 175 | 144 | 144 | 31 | 18% |
| | Average 12 hour | 151 | 139 | 142 | 8 | 6% |

- 2.50 It can be seen from **Table 2-5** that:

- Large journey time savings are observed in the AM peak eastbound direction and PM peak westbound direction. Journey times were much higher for these sections and time periods and this reduction represents a significant improvement in traffic conditions.
- There is a marginal improvement in journey time in the inter peak period. The traffic has not increased considerably as can be seen from **Figure 2-5** and **Figure 2-6**. This is consistent with the pre-scheme conditions generally being better than the peak periods.
- There appears to be a slight increase in journey time in the AM peak westbound direction and PM peak eastbound direction. As noted in section **1.10**, improvements at junction 3 are underway at the time of writing this report to relieve the congestion and delay at M27 J3 westbound exit. Therefore it is likely that the impact of queuing traffic towards J3 has impacted the FYA journey times, rather than a direct impact of the widening scheme.
- Journey time savings observed in the 12 hour period is 10 seconds and 8 seconds in the eastbound and westbound direction respectively.

Variability of Journey Times

- 2.51 Using the same data as used in the previous analysis of average journey times, the average journey time for each hour of the day from 07:00 to 19:00 along the scheme section is provided in **Figure 2-7** and **Figure 2-8**.

Figure 2-7 – Average Journey Time on M27 J3-4 Eastbound

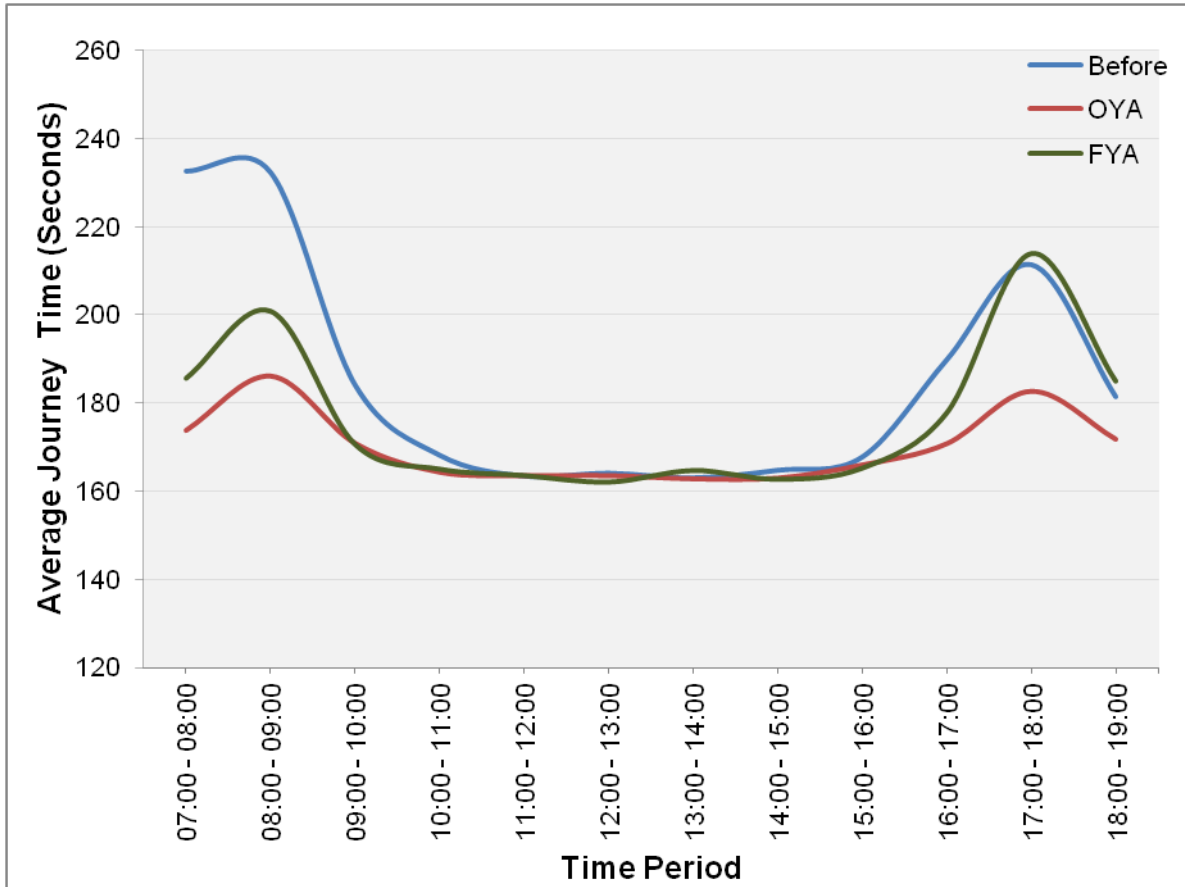
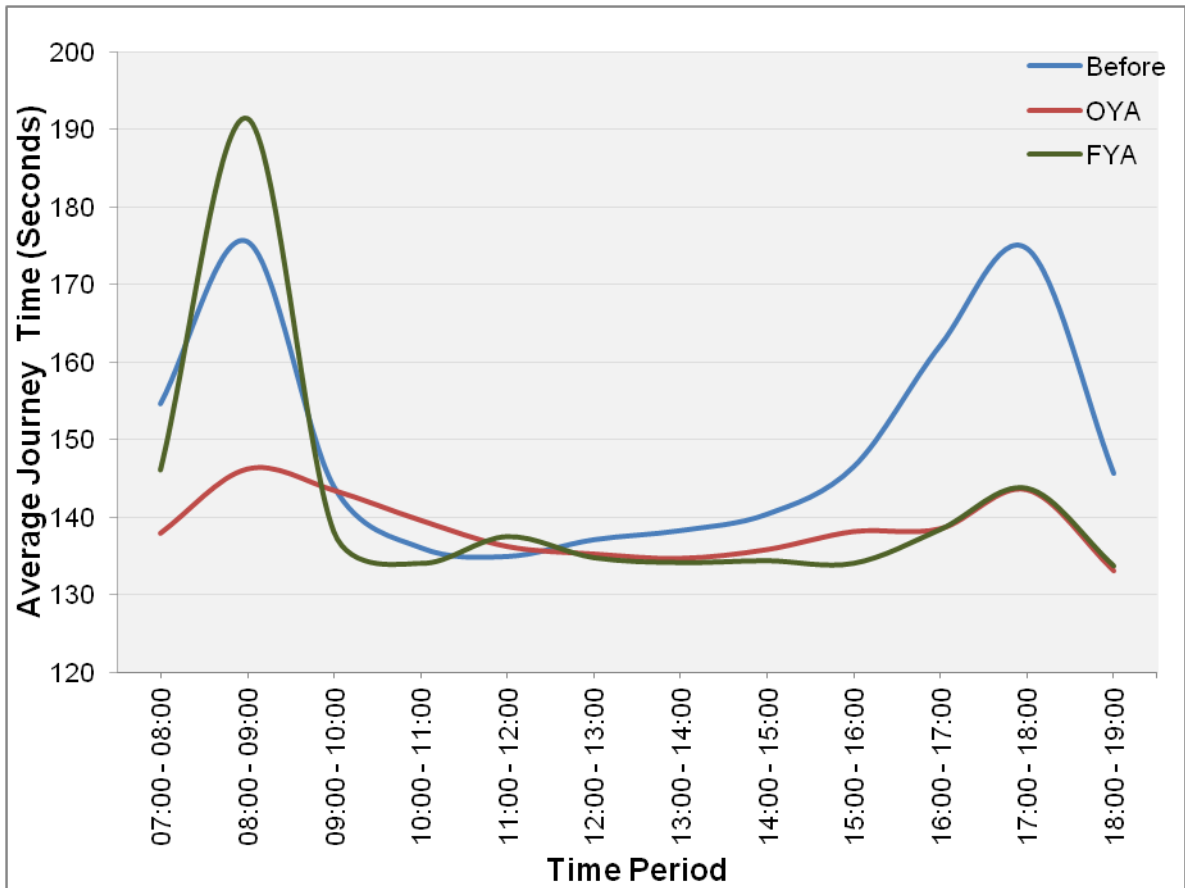


Figure 2-8 – Average Journey Time on M27 J3-4 Westbound



2.52 Figure 2-7 and Figure 2-8 show that:

- Before the scheme opened, each direction demonstrated journey times in one peak period that was at least double that of the inter-peak, indicating considerable variability across different hours of the day.
- The AM peak eastbound and PM peak westbound has greatly improved at FYA with only slightly longer journey times during this period than other times of the day.
- In the PM peak eastbound and AM peak westbound however, the opposite has occurred and journey times have slightly increased compared to the pre-scheme. This indicates that along this section, during peak times, congestion improvements are not being realised. As detailed previously, the increase shown in the AM peak for traffic travelling westbound is likely to be due to queues on the westbound exit slip road backing onto the mainline M27. This slip road is subject to improvements as part of Highways England's Pinch Point programme, as a result of significant congestion at this location.
- Journey times during the interpeak period have remained relatively unchanged along the scheme section in the eastbound direction and lower than pre-scheme in the westbound direction.

Forecast vs. Observed Journey Time Savings

- 2.53 The traffic forecast report for this scheme contained no indication of expected journey time savings. The only specific journey time saving quoted in any of the documents related to the scheme is from the AST which stated that 2 minutes (120 seconds) would be saved in the AM peak. However, it was unclear whether this represented a cumulative 2-way saving, or the expected saving in each direction. For the purpose of this evaluation, it is assumed that the saving refers to one-way saving.
- 2.54 The economics report supporting the scheme clearly states that savings were expected in the 12-hours from 07:00-19:00. **Table 2-5** shows that the journey time savings are observed along both directions during the 12 hour period from 07:00-19:00. However, the only numerical saving given in the AST is for the AM peak.
- 2.55 The figures from JTDB presented above show that the actual time savings are lower than predicted in the AM peak. The exact saving depends on the period considered. Journey time savings observed during the AM peak hour (08:00-09:00) in the eastbound direction are 32 seconds and there is an increase of 16 seconds in the westbound direction. As noted previously, this increase in the westbound direction is likely to be related to congestion at J3 of the M27 backing onto the mainline M27.
- 2.56 While the one hour AM peak may not achieve the predicted savings, it can be observed from **Figure 2-7** and **Figure 2-8** that there is a 2-hour AM peak between 07:00 and 09:00 with the 07:00-08:00 hour saving 47 seconds in the eastbound direction and 9 seconds in the westbound direction.
- 2.57 Finally, the AST provided no information on predicted time savings at other times (outside the AM peak), so no other time comparisons are possible. However, the graph in **Figure 2-7** and **Figure 2-8** suggests that there are further savings generated by this scheme particularly in the PM peak westbound.

Journey Time Reliability

Scheme Objective: to give improved and more reliable journey times

- 2.58 WebTAG states that reliability is a sub-objective of the economic assessment of a scheme and refers to the impact of the scheme on improving journey time variability. It also states that assessment of reliability is a rapidly developing area. As such the following sections present the reliability impact of the scheme based on the route stress method similar to the approach used in the forecasting report.

Appraisal

- 2.59 The scheme AST states that the scheme impact would be that '*Increased journey time reliability and reduced congestion would lead to a reduction in driver stress*'. Overall the AST scored the reliability sub objective as Moderate.
- 2.60 A reliability assessment for the scheme section is provided in the 'M27 J3-4 Widening Forecasting Report (October 2006)'. A stress based approach was used to predict the scheme's impact on reliability. The stress factor for a particular link is defined as the ratio of the Annual Average Daily Traffic flow to the Congestion Reference Flow (DMRB⁶). In the opening year, the stress was forecast to reduce from 89% in DM to 66% in DS indicating an improvement in reliability.
- 2.61 It should be noted that WebTAG guidance indicates that where route stress is considered, "*if any stress value is less than 75% or greater than 125%, the calculation should be based on values of 75% or 125% as appropriate*". Therefore, the predicted reduction should be considered as 89% to 75%.

Evaluation

- 2.62 As previously noted, post opening there is less variability in journey times at different times of the day, suggesting that the increase in capacity provided by the scheme has reduced congestion delays in peak times.
- 2.63 However, in order to make a comparison with the forecasts, a stress based approach (DMRB) has been used to assess the reliability impacts of the scheme. The forecast and observed results are shown in **Table 2-6**.

Table 2-6 – Route Stress on M27 J3-4

| Scenario | Forecast (WebTAG rounded) | Observed |
|-------------------|------------------------------|----------|
| Do-Minimum/Before | 89% | 91% |
| Do-Something/FYA | 66% (75%) | 76% |

- 2.64 It can be seen that route stress has reduced from the pre-scheme level of 91% to 76% at FYA, as would be expected from a scheme that has created extra capacity through the provision of additional lanes and this is close to the forecast values. The results are consistent with the reduction in journey time shown in **Figure 2-7** and **Figure 2-8** showing much smaller spread of times throughout the day, ensuring more predictable journey times throughout the day, and therefore indicating improved reliability. Hence the AST assessment is upheld in this present evaluation and the overall score is **Moderate Beneficial**.

⁶ DMRB (Design Manual for Roads and Bridges) Volume 5, Section1, Part3 TA 46/97 Annex D

Key Points – Traffic Impacts

Traffic Flow impacts

- Traffic flows along the widened section of M27 have increased by 3% compared to pre-scheme and this equates to about 4,200 additional vehicles per weekday.
- There has been a 5% increase in traffic on an average weekday north and south of the scheme section on the M271 and M27 J4W to M3 J14.
- West of the scheme section on the M27 between J2 and J3, traffic levels have remained the same as OYA, but still marginally higher than the pre-scheme levels by 1%. This suggests that there has been little change along this section following the implementation of the scheme.
- Sections east of the scheme section on the M27 between J4W to J4E and J4E to J5 have seen an increase of 2% and 4% respectively and this is higher than the growth seen at OYA.
- The change in the number of heavy vehicles on the scheme section at FYA compared to pre-scheme is 6%.
- Analysis of hourly profile has indicated that the scheme has attracted more traffic in the morning and evening peak periods when the pre scheme congestion levels were high enough for some traffic to choose alternate routes or not to travel at all during that period.

Traffic Forecasting

- The level of traffic forecast along the scheme section was overestimated as this considered background growth in traffic whereas the observed changes in traffic nationally and regionally has shown little change in traffic.
- If the amount of traffic growth forecast between pre-scheme and post opening is removed from the forecast traffic volumes, then the actual increase in traffic along the scheme section as a result of the scheme was expected to be 6.5%, about 8,700 additional vehicles and this is in line with the observed growth. This suggests that the model predicted the impact relatively accurately.

Journey Times

- Large journey time savings are observed in the AM peak eastbound direction and PM peak westbound direction. Journey times were much higher for these sections and time periods and this reduction represents a significant improvement in traffic conditions.
- There appears to be a slight increase in journey time in the AM peak westbound direction and PM peak eastbound direction.
- Journey time savings observed in the 12 hour period is 10 seconds and 8 seconds in the eastbound and westbound direction respectively.

Journey Time Forecasting

- No clear journey time forecasts are available in the forecasting report. The AST states a 2 minutes saving in the AM peak, but no confirmation of distance covered or direction. If observed savings in the peak periods and both directions are considered, the observed savings are lower than forecast.

Journey Time Reliability

- The scheme has had a moderate beneficial effect on journey time reliability in line with that forecast in the appraisal and the route stress has reduced from 91% in the pre-scheme to 76% post opening.

3. Safety Evaluation

Scheme Objective: to improve safety

Introduction

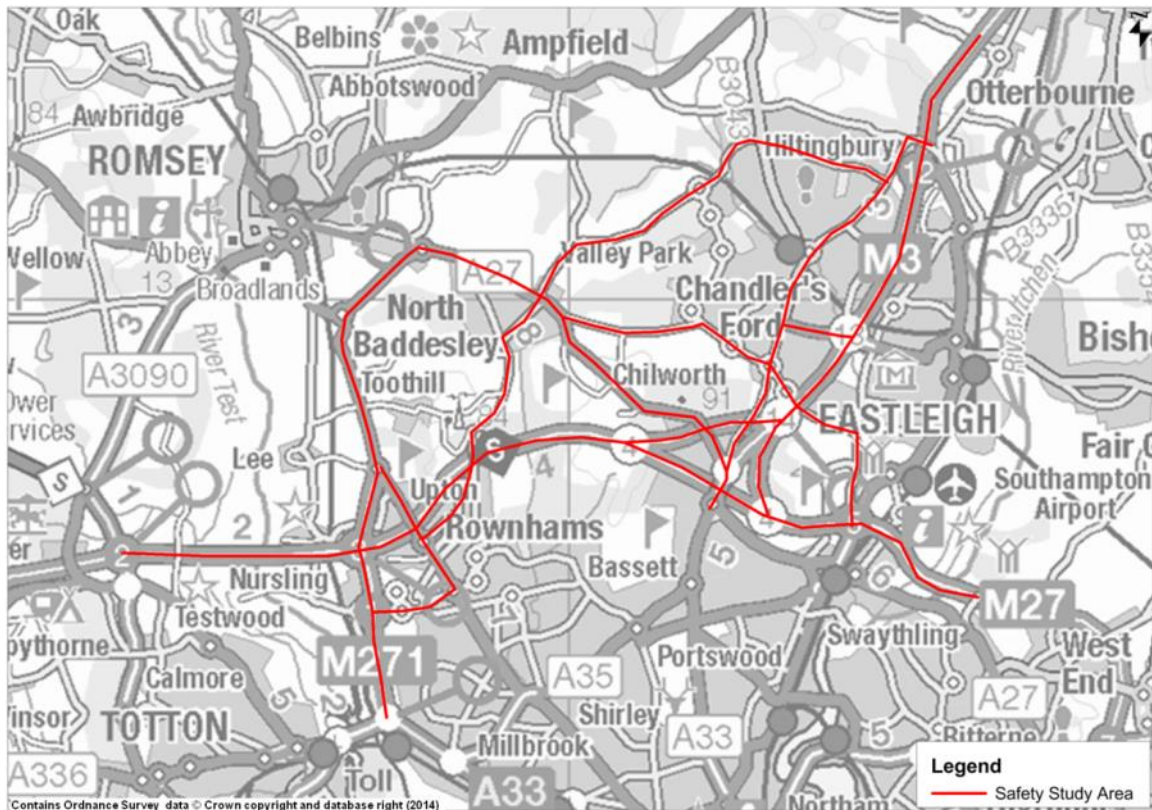
- 3.1 This section of the report examines how successful the scheme has been in addressing the objective of improving safety. The focus of this objective is to reduce the loss of life, injuries and damage to property resulting from transport collisions and crime. This is assessed by analysing the changes in Personal Injury Collisions (PICs) occurring in the five years before start of construction compared to the available post-opening data.
- 3.2 In order to assess the impact of the scheme on collisions, this section of the report analyses the change in personal injury collisions (PICs) occurring in the pre construction period, and the post-opening period. Evaluation of the scheme's impact on personal security has been undertaken through the use of observations made during a site visit.

Data Sources

Forecast Data

- 3.3 For the purposes of assessing the collision impacts of the scheme, forecasts were produced for the number of collisions the scheme is expected to save, together with the associated numbers of casualties and the monetary benefit of the savings. Forecast impacts of the scheme on safety have been obtained from the scheme's Cost Benefit Analysis model (COBA). The forecast saving has been calculated for the opening year, and over the scheme appraisal period of 60 years. This section of the study concerns collision numbers; the economic impact of the change in collisions is evaluated later in the Economy section of this report.
- 3.4 The extent of the COBA model area is shown in **Figure 3-1**. This covers the scheme section, and all the main routes in the immediate and wider vicinity of the scheme where changes in traffic were anticipated, and hence changes in collisions may occur. In order to ensure a like-for-like comparison between the predicted and observed collision changes, the overall geographical area of analysis used for this study is the same area covered by the COBA model.

Figure 3-1– COBA model Area



Observed Data

- 3.5 Collision data for this study was obtained from Hampshire Police.
- 3.6 The collision data is based on the records of PICs (i.e. collisions that involve injuries to one or more persons) recorded in the STATS19 data collected by the police when attending collisions. Collisions that do not result in injury are not included in this dataset and are thus not considered in this evaluation.
- 3.7 It should be noted that at this stage, not all the collision data has been validated by the Department for Transport (DfT). The requirement for up to date and site specific information necessitated the use of unvalidated data sourced from the local authority. The data is judged to be sufficiently robust for use in this study, but it may be subject to change. However, it is not anticipated that this would be significant in terms of the analysis of collision numbers presented in this report.

Forecast Approach

- 3.8 The Economic Assessment Report (EAR) used a COBA analysis to consider the impact on collisions. It concluded that 876 PICs will be saved as a result of the scheme over the 60 year appraisal period over the COBA area considered. The predicted savings along the scheme section over the 60 year appraisal period was 808 collisions (approximately 92% of the total scheme safety benefit) with the majority of this experienced westbound due to the high observed collision rates for this section.
- 3.9 The EAR states that the Do Minimum was based on observed before collision rates while the Do Something was based on COBA defaults. The EAR states as justification for this that “*within COBA the default accident rate is the same for a dual three lane motorway as for a dual four lane motorway which would underestimate the potential benefits*”.

Evaluation Approach

- 3.10 The evaluation is divided into two parts in line with the standard POPE methodology:
- **Key links:** M27 mainline between J3 and J4.

- **COBA network:** M27 mainline between J3 and J4, and other motorway links and local roads as represented in **Figure 3-1**.

3.11 The original appraisal was based on observed data for the period 2000 to 2003 inclusive. This FYA report compares the five years prior to the start of construction, with five years of post-opening data. We also briefly examine the collisions during the construction period. The periods considered are as follows:

- Pre-construction (February 2003 – January 2008)
- During construction (February 2008 – January 2009)
- Post opening (February 2009 – January 2014)

Background Changes in Collision Reduction

3.12 It is widely recognised that, for over a decade, there has been a year-on-year reduction in the number of personal injury collisions on the roads, even against a trend of increasing traffic volumes during much of that period. The reasons for the reduction are considered to be wide ranging and include improved safety measures in vehicles and reduced numbers of younger drivers. This background trend needs to be considered when looking at the changes in collision numbers in the scheme area in the before and after periods. If the scheme had not been built, collision numbers in the area are still likely to have been influenced by wider trends and reduced.

3.13 When the number of collisions in this area in the years before and after the scheme was built is compared, and associate the net change primarily with the scheme, this background reduction is taken into account. The best way to do this is to assume that, if the scheme had not been built, the number of collisions on the roads in the study area here would have dropped at the same rate as they did nationally during the same time period⁷. This gives what is known as a counterfactual scenario. The data for the counterfactual 'without scheme' scenario can then be compared on a like-for-like basis with the observed post opening data which is the 'with scheme' scenario.

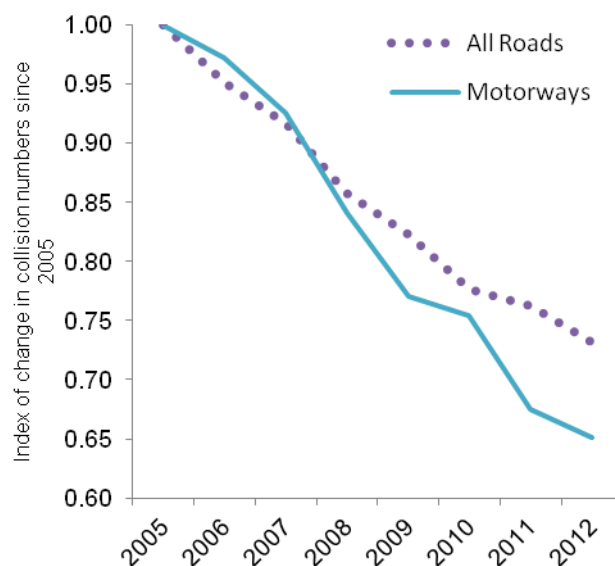
3.14 The difference between the numbers of collisions in these two scenarios can then be attributed to the scheme rather than the wider national trends. This result will inform the calculation of monetised safety benefits achieved by the scheme as discussed in the economy chapter of this report.

3.15 The comparison of the counterfactual scenario compares the national collision data for a representative year in the post opening period (taken as the middle year, 2011).and for a representative year in the pre-construction period (taken as the middle year, 2005). The change in the number of collisions over this period for motorways is calculated from the national collision data.⁸ **Figure 3-2** illustrates the change in collision numbers by road type between 2005 and 2012.

⁷ National trend data is sourced from DfT table RAS10002

⁸ Data sourced from DfT table RAS10002 which includes reported accidents and accident rates by road class and severity, Great Britain.

Figure 3-2– Trends in Injury Collision Numbers



- 3.16 The reduction in national collision numbers presented above is used in the development of the counterfactual scenario for the pre-construction collision data, i.e. how many collisions would have occurred during the pre-construction period had the observed improvement in national safety trends already occurred.

Collision Numbers

- 3.17 This section analyses the observed changes in PICs following the implementation of the scheme. One of the stated objectives of this scheme was to improve safety. This section includes an investigation into the changes in the number of collisions and associated casualties as well as whether there has been any change in the relative severity. We first consider the impact on the scheme key links, and then further detail is provided regarding the impacts on the whole modelled (COBA) area.

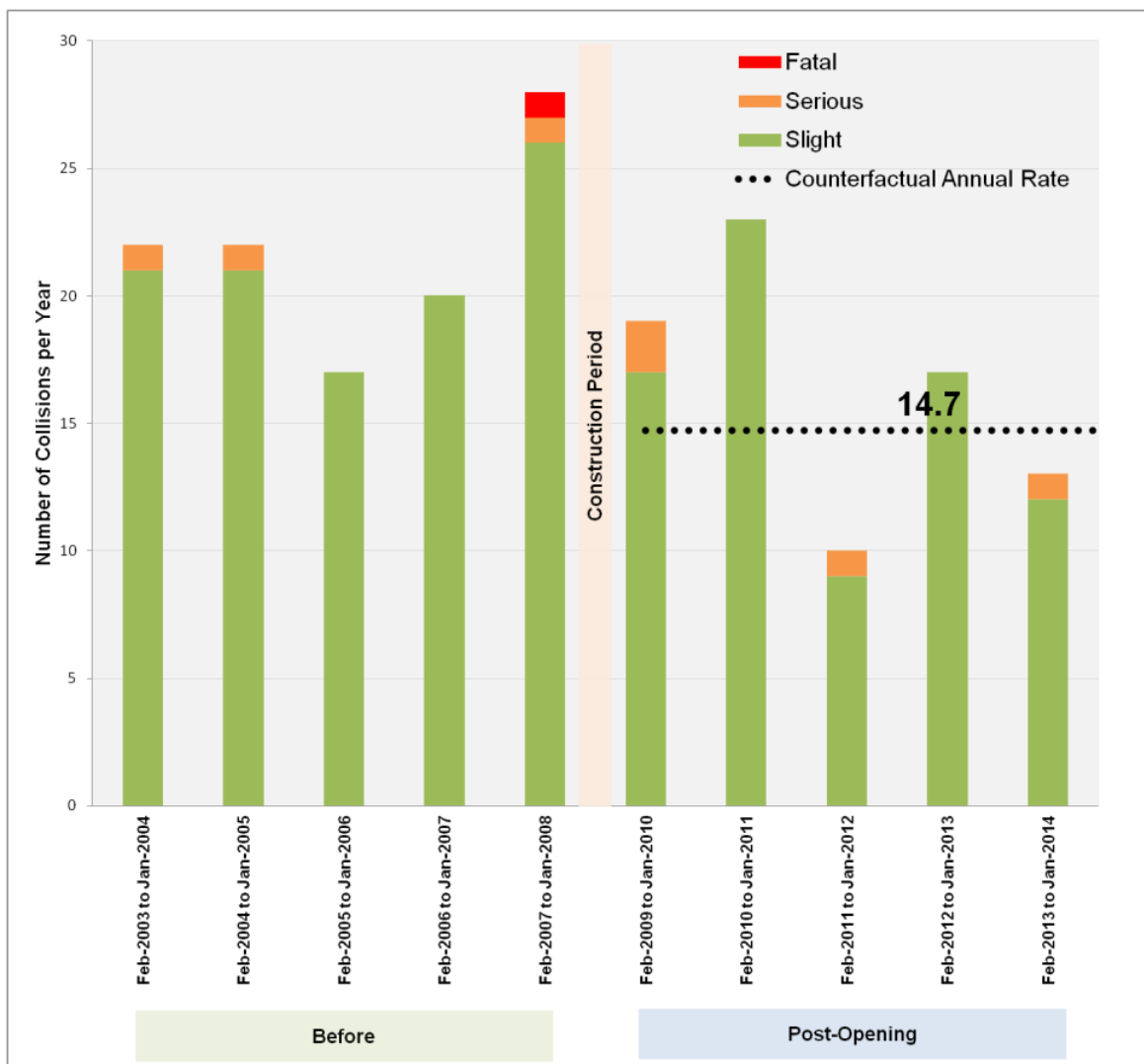
Collision Numbers – Scheme Key Links

- 3.18 An evaluation of before and after opening collision numbers by year for the key links is shown in **Table 3-1**. Additionally presented is the pre-scheme counterfactual number of collisions, which is an alteration, based on the counterfactual scenario in which it is assumed that without the scheme in place, the collision numbers here would have reduced in line with the regional trend. The results are also presented graphically in **Figure 3-3**.

Table 3-1 – Number of Collisions by Severity on the Key Links

| Period | Time Period | | Number of Collisions | | | | Average Annual | | | |
|--|-------------|----------|----------------------|---------|--------|-------|----------------|---------|--------|-------------|
| | From | To | Fatal | Serious | Slight | Total | Fatal | Serious | Slight | All |
| Pre-Scheme | Feb-2003 | Jan-2004 | 0 | 1 | 21 | 22 | 0.2 | 0.6 | 21.0 | 21.8 |
| | Feb-2004 | Jan-2005 | 0 | 1 | 21 | 22 | | | | |
| | Feb-2005 | Jan-2006 | 0 | 0 | 17 | 17 | | | | |
| | Feb-2006 | Jan-2007 | 0 | 0 | 20 | 20 | | | | |
| | Feb-2007 | Jan-2008 | 1 | 1 | 26 | 28 | | | | |
| Without scheme Counterfactual (adjusted for background reduction)⁹ | | | | | | | | | | 14.7 |
| Construction Period | Feb-2008 | Jan-2009 | 0 | 1 | 15 | 16 | 0.0 | 1.0 | 15.0 | 16.0 |
| Post-Opening | Feb-2009 | Jan-2010 | 0 | 2 | 17 | 19 | 0.0 | 0.8 | 15.6 | 16.4 |
| | Feb-2010 | Jan-2011 | 0 | 0 | 23 | 23 | | | | |
| | Feb-2011 | Jan-2012 | 0 | 1 | 9 | 10 | | | | |
| | Feb-2012 | Jan-2013 | 0 | 0 | 17 | 17 | | | | |
| | Feb-2013 | Jan-2014 | 0 | 1 | 12 | 13 | | | | |

Figure 3-3 – Number of Collisions on Year by Year Basis for Key Links



⁹ Background factor in collision numbers for Motorways 2005-2011 was 0.68.

3.19 It can be seen from **Figure 3-3** and **Table 3-1** that:

- The observed annual collision rate in the post opening is slightly higher than the ‘without scheme’ counterfactual collision rate (accounting for the background reduction in collisions over time), with an increase of 1.7 collisions (11.6%). A Chi Square test has been carried out on the collision data given above and this does not show a statistically significant change. Thus the change in the average annual number of collisions may have occurred by chance, and not as a result of the scheme.
- There have been no fatal collisions in the five years post scheme opening.
- The number of slight collisions has reduced significantly post opening, and a small increase in serious collisions is indicated at FYA.
- This small increase seen post opening is not statistically significant, and therefore cannot be directly linked to the scheme.

Casualty Numbers – Scheme Key Links

3.20 In addition to analysing the number of observed collisions, it is also useful to investigate trends in the number of casualties associated with these incidents.

3.21 **Table 3-2** presents casualty numbers and the severity index for the key links.

Table 3-2 – Number of Casualties on the Key Links

| Period | Time Period | | Number of Casualties | | | | Average Annual | | | |
|---|-------------|----------|----------------------|---------|--------|-------|----------------|---------|--------|------|
| | From | To | Fatal | Serious | Slight | Total | Fatal | Serious | Slight | All |
| Pre-Scheme | Feb-2003 | Jan-2004 | 0 | 2 | 33 | 35 | 0.2 | 1.0 | 28.6 | 29.8 |
| | Feb-2004 | Jan-2005 | 0 | 2 | 26 | 28 | | | | |
| | Feb-2005 | Jan-2006 | 0 | 0 | 18 | 18 | | | | |
| | Feb-2006 | Jan-2007 | 0 | 0 | 31 | 31 | | | | |
| | Feb-2007 | Jan-2008 | 1 | 1 | 35 | 37 | | | | |
| Without scheme Counterfactual (adjusted for background reduction)¹⁰ | | | | | | | | | | 22.4 |
| Construction Period | Feb-2008 | Jan-2009 | 0 | 1 | 23 | 24 | 0.0 | 1.0 | 23.0 | 24.0 |
| Post-Opening | Feb-2009 | Jan-2010 | 0 | 2 | 26 | 28 | 0.0 | 0.8 | 23.6 | 24.4 |
| | Feb-2010 | Jan-2011 | 0 | 0 | 33 | 33 | | | | |
| | Feb-2011 | Jan-2012 | 0 | 1 | 18 | 19 | | | | |
| | Feb-2012 | Jan-2013 | 0 | 0 | 23 | 23 | | | | |
| | Feb-2013 | Jan-2014 | 0 | 1 | 18 | 19 | | | | |

3.22 It can be seen from **Table 3-2** that:

- Taking into account the national trend in casualty reduction, there is an increase of 2 casualties (9%) per annum post scheme opening, in line with the trend seen for collisions.
- No fatal casualties are seen post opening, and a slight reduction in serious casualties is also seen.
- There is a saving of 5.0 slight casualties per annum post scheme opening.

¹⁰ Background factor of Casualties for Great Britain 2005-2011 was 0.75.

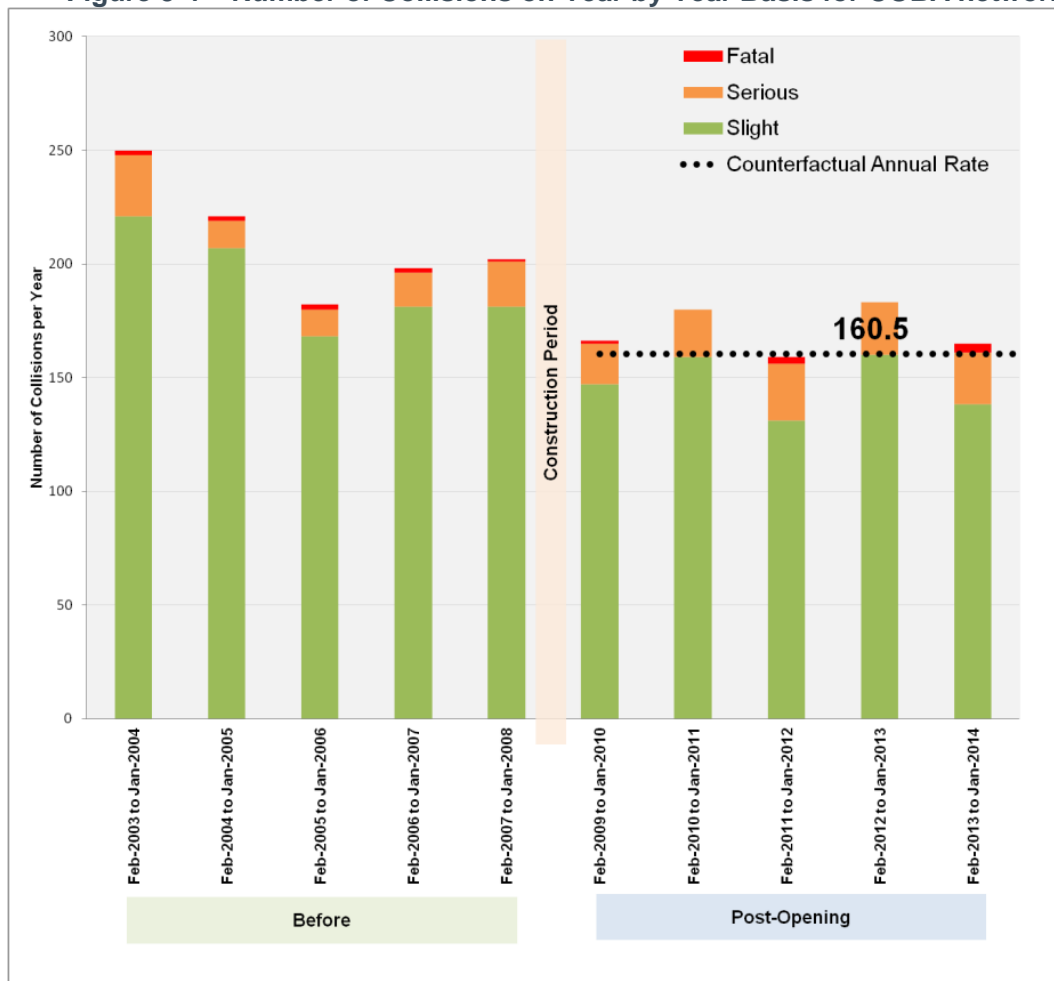
Collision Numbers - COBA Area

3.23 An evaluation of before and after opening collision numbers by year for the COBA area is shown in Table 3.3. The results are also presented graphically in Figure 3.4.

Table 3-3 – Number of Collisions by Severity in the COBA Area

| Period | Time Period | | Number of Collisions | | | | Average Annual | | | |
|---|-------------|----------|----------------------|---------|--------|-------|----------------|---------|--------|--------------|
| | From | To | Fatal | Serious | Slight | Total | Fatal | Serious | Slight | All |
| Pre-Scheme | Feb-2003 | Jan-2004 | 2 | 27 | 221 | 250 | 1.8 | 17.2 | 191.6 | 210.6 |
| | Feb-2004 | Jan-2005 | 2 | 12 | 207 | 221 | | | | |
| | Feb-2005 | Jan-2006 | 2 | 12 | 168 | 182 | | | | |
| | Feb-2006 | Jan-2007 | 2 | 15 | 181 | 198 | | | | |
| | Feb-2007 | Jan-2008 | 1 | 20 | 181 | 202 | | | | |
| Without scheme Counterfactual (adjusted for background reduction)¹¹ | | | | | | | | | | 160.5 |
| Construction Period | Feb-2008 | Jan-2009 | 1 | 19 | 164 | 184 | 1.0 | 19.0 | 164.0 | 184.0 |
| Post-Opening | Feb-2009 | Jan-2010 | 1 | 18 | 147 | 166 | 1.6 | 22.0 | 147.0 | 170.6 |
| | Feb-2010 | Jan-2011 | 0 | 21 | 159 | 180 | | | | |
| | Feb-2011 | Jan-2012 | 3 | 25 | 131 | 159 | | | | |
| | Feb-2012 | Jan-2013 | 0 | 23 | 160 | 183 | | | | |
| | Feb-2013 | Jan-2014 | 4 | 23 | 138 | 165 | | | | |

Figure 3-4 – Number of Collisions on Year by Year Basis for COBA network



¹¹ Background factor in collision numbers for All Road types 2005-2011 was 0.76.

3.24 From **Table 3-3** and **Figure 3-4**, it can be seen that:

- The ‘without scheme’ counterfactual collision rate (accounting for the background reduction in collisions over time) is calculated as 160.5 collisions per year. Compared with the post opening collision rate of 170.6 per year, this represents an annual increase of 10.1 collisions (5.9%). A Chi Square test has been carried out on the collision data given above and this does not show a statistically significant change. Thus the change in the average annual number of collisions may have occurred by chance, and not as a result of the scheme.
- The annual average number of fatal collisions reduced by 20% post opening, although the number of serious collisions increased.
- This change post opening in the number of collisions is not statistically significant and cannot be confidently associated directly as a result of the scheme.

Casualty Numbers - COBA Area

Table 3-4 – Number of Casualties on the COBA Area

| Period | Time Period | | Number of Casualties | | | | Average Annual | | | |
|---|-------------|----------|----------------------|---------|--------|-------|----------------|---------|--------|-------|
| | From | To | Fatal | Serious | Slight | Total | Fatal | Serious | Slight | All |
| Pre-Scheme | Feb-2003 | Jan-2004 | 2 | 33 | 320 | 355 | 2.0 | 20.4 | 270.0 | 292.4 |
| | Feb-2004 | Jan-2005 | 3 | 14 | 301 | 318 | | | | |
| | Feb-2005 | Jan-2006 | 2 | 16 | 226 | 244 | | | | |
| | Feb-2006 | Jan-2007 | 2 | 16 | 240 | 258 | | | | |
| | Feb-2007 | Jan-2008 | 1 | 23 | 263 | 287 | | | | |
| Without scheme Counterfactual (adjusted for background reduction)¹² | | | | | | | | | | 220.0 |
| Construction Period | Feb-2008 | Jan-2009 | 1 | 21 | 231 | 253 | 1.0 | 21.0 | 231.0 | 253.0 |
| Post-Opening | Feb-2009 | Jan-2010 | 1 | 19 | 211 | 231 | 1.6 | 23.6 | 206.2 | 231.4 |
| | Feb-2010 | Jan-2011 | 0 | 21 | 225 | 246 | | | | |
| | Feb-2011 | Jan-2012 | 3 | 26 | 189 | 218 | | | | |
| | Feb-2012 | Jan-2013 | 0 | 24 | 218 | 242 | | | | |
| | Feb-2013 | Jan-2014 | 4 | 28 | 188 | 220 | | | | |

3.25 Key points regarding the casualty numbers shown in Table 3-4 are:

- Fatal casualties have reduced to annual average of 1.6 since scheme opening compared with 2.0 in the pre-scheme.
- Annual average slight casualties have reduced by 24% and serious casualties have increased by 16%.
- Taking into account the national background trend, there is an increase of 11.4 casualties per annum.

Collision and Casualty Severity Index –Key Links

3.26 The collision severity index is the ratio of the number of collisions classed as serious or fatal compared to the total number of collisions. The casualty severity index is the ratio of the number of casualties classed as serious or fatal compared to the total number of casualties. A summary of the before and after opening collision and casualty severity indices by year is shown in **Table 3-5** for the key links and **Table 3-6** for the COBA area.

¹² Background factor of Casualties for Great Britain 2005-2011 was 0.75.

Table 3-5 –Collision and Casualty Severity Index on the Key Links

| Period | From | To | Collision Severity Index | Annual Average | Casualty Severity Index | Annual Average |
|--------------|----------|----------|--------------------------|----------------|-------------------------|----------------|
| Pre Scheme | Feb-2003 | Jan-2004 | 0.05 | 0.04 | 0.06 | 0.04 |
| | Feb-2004 | Jan-2005 | 0.05 | | 0.07 | |
| | Feb-2005 | Jan-2006 | 0.00 | | 0.00 | |
| | Feb-2006 | Jan-2007 | 0.00 | | 0.00 | |
| | Feb-2007 | Jan-2008 | 0.07 | | 0.05 | |
| Construction | Feb-2008 | Jan-2009 | 0.06 | 0.06 | 0.04 | 0.04 |
| Post Opening | Feb-2009 | Jan-2010 | 0.11 | 0.05 | 0.07 | 0.03 |
| | Feb-2010 | Jan-2011 | 0.00 | | 0.00 | |
| | Feb-2011 | Jan-2012 | 0.10 | | 0.05 | |
| | Feb-2012 | Jan-2013 | 0.00 | | 0.00 | |
| | Feb-2013 | Jan-2014 | 0.08 | | 0.05 | |

Collision and Casualty Severity Index –COBA Area

Table 3-6 – Collision and Casualty Severity Index on the COBA Area

| Period | From | To | Collision Severity Index | Annual Average | Casualty Severity Index | Annual Average |
|--------------|----------|----------|--------------------------|----------------|-------------------------|----------------|
| Pre Scheme | Feb-2003 | Jan-2004 | 0.12 | 0.09 | 0.10 | 0.08 |
| | Feb-2004 | Jan-2005 | 0.06 | | 0.05 | |
| | Feb-2005 | Jan-2006 | 0.08 | | 0.07 | |
| | Feb-2006 | Jan-2007 | 0.09 | | 0.07 | |
| | Feb-2007 | Jan-2008 | 0.10 | | 0.08 | |
| Construction | Feb-2008 | Jan-2009 | 0.11 | 0.11 | 0.09 | 0.09 |
| Post Opening | Feb-2009 | Jan-2010 | 0.11 | 0.14 | 0.09 | 0.11 |
| | Feb-2010 | Jan-2011 | 0.12 | | 0.09 | |
| | Feb-2011 | Jan-2012 | 0.18 | | 0.13 | |
| | Feb-2012 | Jan-2013 | 0.13 | | 0.10 | |
| | Feb-2013 | Jan-2014 | 0.16 | | 0.15 | |

- 3.27 The collision severity index for the scheme key links has increased slightly while the casualty severity index has reduced post scheme opening. For the COBA area both the collision and casualty severity index has marginally increased post scheme opening. This can be attributed to the fact that the total number of slight collisions has reduced faster compared to the number of fatal and serious collisions.

Fatalities & Weighted Injuries

- 3.28 The collision rate discussed above does not take into account the severity of collisions. To analyse this, the Fatalities and Weighted Injuries (FWI) metric is presented which is a combined measure of casualties based on the numbers of fatal, serious and slight casualties. The FWI for the five years before and five years after period is shown in **Table 3-7**. To take into account the changes in traffic on the M27 and for comparison with other schemes, the FWI rate per billion vehicle kilometres (bvkm) is also presented. It should be noted that these figures do not account for changes in background reduction in collisions/casualties.

Table 3-7 – FWI on the Key Links

| Period | FWI/collision | FWI/year | FWI/bvkm |
|--------------|---------------|----------|----------|
| Pre-Scheme | 0.03 | 0.59 | 2.93 |
| Post-Opening | 0.02 | 0.32 | 1.50 |

- 3.29 From **Table 3-7** it can be seen that each of the FWI metrics have reduced following scheme opening. The FWI/bvkm has reduced to 1.5 from 2.93.

Collision Locations

- 3.30 **Figure 3-5** and **Figure 3-6** maps the locations of collisions in the scheme area in the five years before and after the scheme was built.

Figure 3-5 – Collision Locations – Pre-scheme

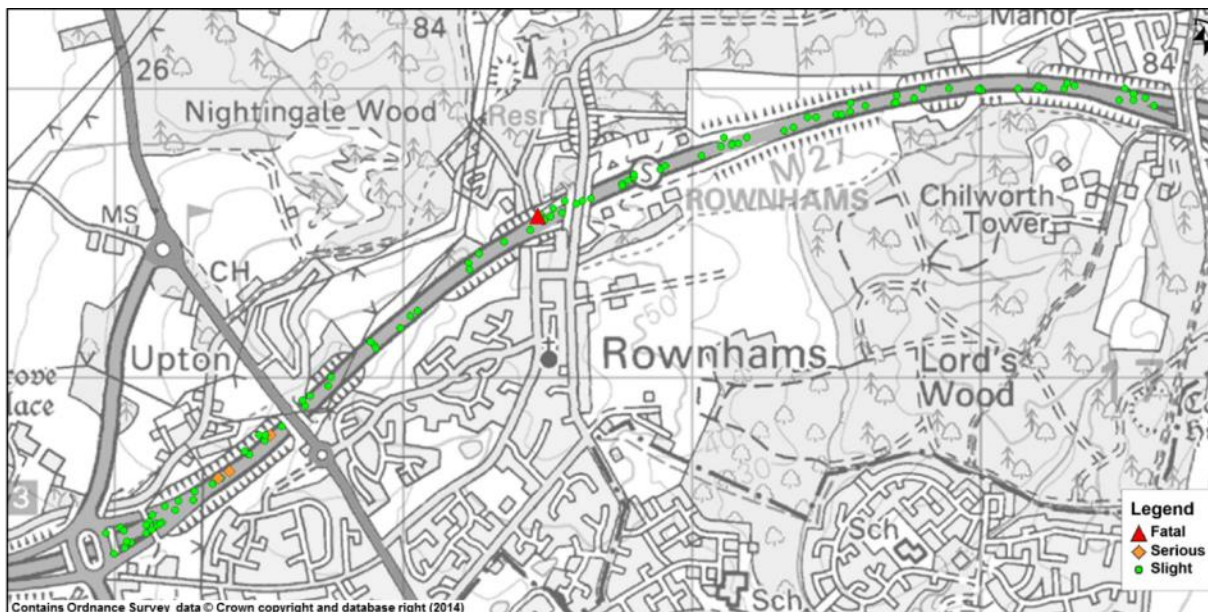
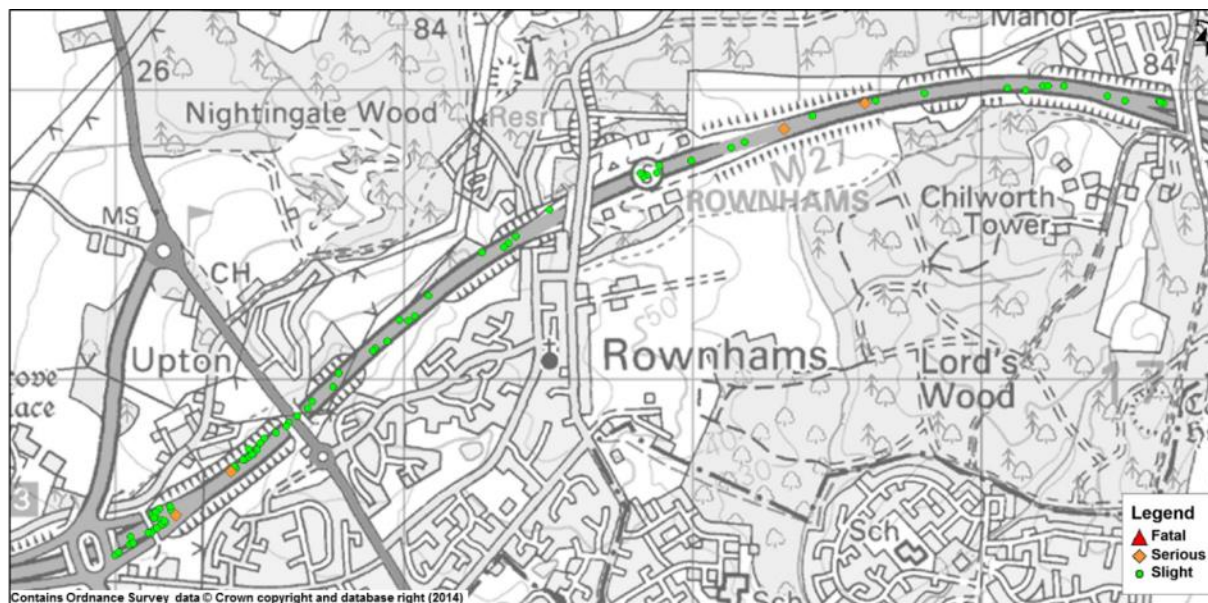


Figure 3-6 – Collision Locations – Post Opening



- 3.31 From **Figure 3-5** and **Figure 3-6** it can be seen that collisions were evenly distributed along the link with slightly higher concentrations near the junctions (M27 J3 and J4) before the scheme was constructed. Post scheme opening, there is no observable re-distribution of collision. However the collisions at either junction remain same as pre-scheme levels with the cluster at J3 being more prominent. Post opening, the number of collisions in the middle of the scheme section has decreased. The available observed collision data does not allow analysis by direction.

Forecast vs. Outturn Collision Numbers

- 3.32 This section compares the number of observed collisions, as discussed earlier, with the forecast collisions for the scheme opening year. The forecasts have been obtained from the COBA model for this scheme and cover the whole of the modelled area (as shown in **Figure 3-1**). For the

outturn collisions the observed annual average before and after the scheme opening are used for the same area.

Table 3-8 – Comparison of Forecast and Outturn Collisions for the COBA Area

| | | |
|-------------------------------|---------------------------------|------------|
| Forecast Opening Year | Do Minimum (without scheme) | 114.5 |
| | Do Something (with scheme) | 100.8 |
| | Saving | 13.7 |
| | % Change | 12% |
| Outturn Annual Average | Before Opening | 210.6 |
| | Before Opening (counterfactual) | 160.5 |
| | After Opening | 170.6 |
| | Change* | -10.1 |
| | % Change* | -6% |

* Comparison of before and after completed using counterfactual scenario for before.

- 3.33 It can be seen from **Table 3-8** that the scheme appraisal forecast a decrease of 12% collisions in the opening year. However, there has been an observed average increase in collisions of 10 per year, representing an increase of 6%, when comparing the post-opening data to the counterfactual collisions which adjusts the pre-scheme data for background collision trends.
- 3.34 Without the counterfactual adjustment we see that there has been a decrease in collisions, but we cannot attribute this saving solely to the scheme without adjusting for background collision trends.
- 3.35 Pre scheme observed collision rates were noted in the EAR to be higher than the COBA default rate for a 3 lane motorway, hence these observed rates were used in the appraisal to ensure that the collisions savings would not be underestimated. The EAR notes that “*within COBA the default accident rate is the same for a dual three lane motorway as for a dual four lane motorway which would underestimate the potential benefits*”. In the absence of a known alternative rate, default collision rates were used for the post opening scenario, although the EAR noted that this may not be representative.
- 3.36 This forecast collision saving has not materialised based on observed data. Before the scheme, accident rates were much higher than the default assumptions for this type of road. Changing from 3 lanes to 4 lanes should not in itself be expected to reduce the collision rate, nor were significant changes in road standard implemented. Therefore the forecast was over-optimistic.

Collision Rates – Key Links

- 3.37 The number of collisions along a length of road together with its AADT (Annual Average Daily Traffic) can be used to calculate a collision rate (calculated as number of collisions per million vehicle kilometres). By looking at the rates the impact on the roads of most interest can be seen whilst ignoring the impact of the change in traffic volumes. **Table 3-9** shows the observed pre and post opening collision rates on the scheme key links.

Table 3-9 – Forecast vs. Observed Collision Rates (PIC/mvkm) for the Key Links

| | | |
|---|--|---------------|
| Forecast (opening year) | Do-Minimum (without scheme) | 0.181 |
| | Do-Something (with scheme) | 0.092 |
| | Forecast Saving | 0.089 |
| Observed (Pre-scheme vs. Post-opening collision rates) | Pre-scheme Observed | 0.109 |
| | Pre-scheme Counterfactual Rate ¹³ | 0.072 |
| | Post-Opening Observed | 0.078 |
| | Observed Saving* | -0.006 |

*Observed saving is calculated using counterfactual before scenario.

¹³ Counterfactual without scheme is the observed rate in the before period multiplied by the national reduction in collisions rate per mvkm during the comparable period, for the middle year of the data collection periods, in this case 2005 for before the period and 2011 for the after period. The reduction factor in the collision rate for motorways was 0.66.

- 3.38 The results in **Table 3-9** shows that the observed collision rate has increased post scheme opening when taking the background reduction into account. The net increase observed is 0.006 PIC/mvkm when compared to pre-scheme counterfactual rate. The collision rate was forecast to reduce by 0.089 post scheme opening. A comparison of observed and forecast collision rate for DM and DS shows that the observed collision rate is still less than the forecast rate.

Security

- 3.39 The aim of this sub-objective is to consider both the changes in security and the likely number of users affected by the changes. For highway schemes, security includes the perception of risk from damage to or theft from vehicles, personal injury or theft of property from individuals or from vehicles. Security issues may arise from the following:
- On the road itself (e.g. being attacked whilst broken down).
 - In service areas/car parks/lay-bys (e.g. vehicle damage while parked at a service station, attached whilst walking to a parked car).
 - At junctions (e.g. smash and grab incidents while queuing at traffic lights).
- 3.40 The primary indicators for roads include surveillance, landscaping, lighting and visibility, emergency call facilities and pedestrian and cycling facilities.

Forecast

- 3.41 The AST states that the scheme's impact on security will be neutral, though recognises the fact that the scheme was likely to increase average speed along the link.

Evaluation

- 3.42 As shown in the Traffic Analysis section, the scheme has improved journey times, and this has increased the average speed along the link, although this is not strictly a security indicator.
- 3.43 No primary indicators for security have been affected as a result of this scheme, and therefore the impact of the scheme is considered neutral, as expected.

Key Points - Safety

Collisions

- The annual average number of collisions on the scheme key links, i.e. M27 J3-4, has seen very little change (a 1.7 collisions per annum increase) at the FYA stage when accounting for the background trend in collision reduction. This change is not a statistically significant change.
- Analysis of collision data for the wider COBA area shows a similar trend to the key links and there is a marginal increase of 10 in the number of collisions at OYA. This increase should be considered against the increased traffic along the scheme section and on other roads in the vicinity of the scheme, which were part of COBA appraisal.
- Collision and casualty severity index has increased marginally post opening in the wider COBA area.
- Collision rates along the scheme key links have reduced slightly post opening suggesting that the scheme has had a beneficial impact for safety along the key links without accounting for background growth. It should be noted that this does not reflect changes in the wider study area.

Location of Collisions

- There is no observable redistribution of collisions post scheme opening. There is a reduction in collisions at middle of the section between J3 and J4 and the cluster of collisions near the junctions remain the same.

Forecast vs. Outturn Collision Savings

- The collision rate was forecast to reduce by 0.089 PIC/mvkm post scheme opening. Post opening, no observable change is noted when compared to pre-scheme counterfactual rate.
- The scheme appraisal forecast a decrease of 12% collisions in the opening year. This has not materialised. Before the scheme the collision rates were much higher than the default assumptions for this type of road. Changing from 3 lanes to 4 lanes should not itself be expected to reduce the collision rate, nor were significant changes in road standard implemented. Therefore the forecast was over-optimistic.

Security

- The scheme's impact on security is assessed as neutral, as expected.

4. Economy

Introduction

- 4.1 This section presents an evaluation of how the scheme is performing against the DfT's economy objective, which is defined in WebTAG as:

To support sustainable economic activity and get good value for money

- 4.2 The five sub-objectives for economy are as follows:

- Get good value for money in relation to impacts on public accounts.
- Improve transport economic efficiency for business users and transport providers.
- Improve transport economic efficiency for consumer users.
- Improve reliability.
- Provide beneficial wider economic impacts.

- 4.3 When a scheme is appraised, an economic assessment is used to determine the scheme's value for money. This assessment is based on an estimation of costs and benefits from different sources:

- Transport Economic Efficiency (TEE) benefits (savings related to travel times, vehicle operating costs and user charges).
- Collision costs (savings related to numbers and severity level of accidents).
- Costs to users due to delays during construction and future maintenance periods.

- 4.4 This section provides a comparison between the outturn costs and benefits and the forecast economic impact, as well as evaluating reliability and the scheme's wider economic impacts.

Sources

- 4.5 The economic assessment presented in this section is based upon:

- M27 Junctions 3 to 4 Widening Economic Assessment Report – August 2006 (including COBA input file in appendix).
- The forecast scheme costs have been taken from the pre-construction ministerial approved budget (MP Director's Instruction 06/07, Annex 1, Version 1.2 final-a, issued May 2007).
- Outturn costs obtained from the Highways England Regional Finance Manager-May 2014.

Forecast Benefits

- 4.6 A summary of the predicted scheme impacts from the Economic Assessment Report for the central growth is shown in **Table 4-1**. This shows that over the 60 year appraisal period the scheme was predicted to generate about £356 million benefits with the vast majority arising from reduced journey times.

- 4.7 A green tick in **Table 4-1** indicates that this element of the benefits will be considered as part of this evaluation.

Table 4-1 – Economic Benefits of Scheme

| Benefit Stream | Predicted Benefits (£m 2002 prices, discounted) | | Evaluation | |
|-------------------------|--|--------------|------------|--|
| | £m | % | Evaluate? | Reasons |
| Journey Times | 320.8 | 90.2 | ✓ | Represents a considerable proportion of the overall scheme benefits Relatively straightforward to measure outturn impacts in opening year. |
| Vehicle Operating Costs | -2.5 | -0.7 | ✓ | Based on the ratio of fuel consumption forecast and observed. |
| Safety | 37.5 | 10.5 | ✗ | Change in safety shown to not be statistically significant, and therefore not monetised here. |
| Total | 355.8 | 100.0 | | |

Present Value Benefits (PVB)

- 4.8 A cost benefit analysis of a major scheme requires all the benefits to be considered for the whole of the appraisal period and they need to be expressed on a like-for-like basis with the benefits. This basis is termed Present Value. Present Value is the value today (or at a set consistent date) of an amount of money in the future. In cost-benefit analysis, values in differing years are converted to a standard base year by the process of discounting giving a present value.
- 4.9 Following current Treasury Green Book guidance, calculation of the present value entails the conversion to market prices, then discounting by year. This using a rate of 3.5% for the first 30 years and 3% thereafter.

Journey Time Benefits

Forecast Journey Time Benefits

- 4.10 Journey time benefits for this scheme were forecast using the Department for Transport's (DfT) TUBA (Transport Users Benefit Analysis) (version 1.6) program over a 60-year appraisal period and were published in the Economic Assessment Report.

Evaluation of Journey Time Benefits

- 4.11 It is not possible to use TUBA outputs to create a comparable forecast based on the impacts on the M27 scheme only as TUBA is matrix based and its output does not give any breakdown of the impacts by link or area. This POPE evaluation has therefore compared the predicted opening year vehicle hour saving (based on forecast flows and journey times) and the observed journey times before and five years after opening (used to calculate an empirically based observed vehicle hour saving). From **Table 4-2** it can be seen that the forecast vehicle hour savings on the scheme section is much higher than the outturn vehicle hour savings. The two contributing factors to this are (i) outturn changes in traffic flow are much lower than forecast and (ii) outturn improvements in journey times are also much lower than forecast.

Table 4-2 – Opening Year Vehicle Hour Savings (hours)

| Scheme Section | Forecast | Observed | Ratio |
|-----------------------|----------|----------|-------|
| M27 between J3 and J4 | 291,329 | 91,090 | 31% |

- 4.12 The 31% ratio between the forecast and outturn savings is applied to the forecast journey time benefits in line with the POPE methodology. **Table 4-3** compares the forecast with the outturn assessment.

Table 4-3 – Monetised Journey Time Benefits

| Present Value Benefits (£m 2002 prices, discounted) | Forecast | Outturn |
|--|----------|---------|
| Journey Time Benefits | 320.8 | 100.3 |

- 4.13 The results presented in **Table 4-3** show that the outturn journey time benefits at the FYA stage are lower than forecast. This difference can be attributed to the fact that observed traffic on the scheme section is lower than forecast and the journey time savings are not as high as expected.

Vehicle Operating Costs (VOC)

Forecast Benefits

- 4.14 As with journey time benefits for this scheme, the change in vehicle operating costs was forecast using the Department for Transport's (DfT) TUBA (Transport Users Benefit Analysis) (version 1.6) program. The forecast vehicle operating costs over the whole 60-year appraisal period have been taken from the Economic Assessment Report. The total disbenefit forecast was 0.7% of the total PVB.

Evaluation of Vehicle Operating Costs

- 4.15 For most highway schemes including this one, the VOC and indirect tax impacts are both very closely linked to changes in fuel consumption (e.g. changes in speeds). That is, if there is increased fuel consumption, VOC will be a disbenefit due to users paying more for fuel and thus more indirect tax will be collected by the Treasury. For this evaluation, the ratio used for the reforecast indirect tax calculation (detailed later in section 4.33) has been applied to the monetary value for VOC.
- 4.16 The forecast and the outturn vehicle operating cost comparison is shown in **Table 4-4**.

Table 4-4 – Monetised Vehicle Operating Costs

| Present Value Benefits (£m 2002 prices, discounted) | Forecast | Outturn |
|--|----------|---------|
| Vehicle Operating Costs | -2.5 | -0.9 |

- 4.17 This evaluation shows that the outturn disbenefit is lower than forecast due to the lower than expected increase in traffic and less change in speeds.

Safety Benefits

- 4.18 For the purpose of assessing the economic impacts of road schemes changes in safety are monetised, as measured by changes in collision numbers and severity. Forecast benefits were appraised in line with the COBA Manual (DMRB Volume 13, Section 1) and produced by the computer program, COBA (version 11).

Forecast Benefits

- 4.19 As was previously shown in **Section 3**, the COBA model expected the scheme to save 10.7 collisions in the opening year.

Evaluation of Safety Benefits

- 4.20 The analysis performed at this FYA stage (**Section 3 of this report**) showed that there is no statistical evidence that the scheme has had an impact on safety within the study area. As such the monetised safety impact is reforecast to be £0m.
- 4.21 The key points for the outturn safety outturn benefits are:
- Outturn safety benefits are reforecast to be £0m.
 - As the collision saving is lower than predicted at this stage due to the greater than expected background reduction in collision, the long term monetary benefits are expected to be lower than predicted.

Forecast vs Outturn Benefits Comparison

4.22 A comparison of all forecast and outturn benefits is presented in **Table 4-5**.

Table 4-5 – Summary of Forecast and Observed Present Value Benefits

| Present Value Benefits (£m 2002 prices, discounted) | Forecast | Outturn |
|--|--------------|-------------|
| Journey Times | 320.8 | 100.3 |
| Vehicle Operating Costs | -2.5 | -0.9 |
| Safety | 37.5 | 0 |
| PVB | 355.8 | 99.4 |

4.23 The outturn benefits are lower than forecast mainly due to lower than expected journey time benefits.

Scheme costs

Introduction

4.24 This section compares the forecast costs of the scheme as of the start of the construction period with the actual spend at the time of this evaluation.

4.25 Costs of the scheme are also considered for the full appraisal period of 60 years such that they can be compared with the benefits over the same period. The full costs examined were made up of the following:

- Investment costs : before and during construction;
- Indirect Tax Revenues: during the 60 years after opening.

4.26 Investment costs are considered in terms of a common price base of 2002 for comparison with forecast. For comparison with the benefits, overall costs are expressed in terms of present value, termed Present Value Cost (PVC).

Investment Costs

4.27 The investment cost is the cost to Highways England of constructing the scheme and purchasing any land. The forecast scheme cost has been obtained from the latest ministerial approved budget. This provides the undiscounted M27 J3 to J4 widening costs (including forecast spend, scheme risks, optimum bias and land provisions) in 2006 costs for second quarter. This has been converted to 2002 prices for comparison with outturn costs using a 2006Q2 RPI of 197.6 and 2002 RPI of 176.2. Historic costs are excluded from the calculation of forecast investment cost. Outturn scheme costs have been supplied by the Highways England Regional Finance Manager. The forecast costs included more gantries than actually installed, and an additional element of lighting that was not implemented, as detailed in the introduction chapter of this report.

4.28 A comparison between the forecast and outturn investment cost is presented in **Table 4-6**.

Table 4-6 – Summary of Investment Costs

| £m 2002 prices | Forecast Cost | Outturn Cost | Difference |
|-----------------|---------------|--------------|------------|
| Investment cost | 29.9 | 27.4 | -8% |

4.29 It can be seen from **Table 4-6** that the outturn cost is lower than the forecast cost by 8%.

Indirect Tax Revenues

4.30 Indirect tax revenue is the expected change in indirect tax revenue to the Government due to changes in the transport sector as a result of the scheme over the appraisal period. For the

highway scheme in this study, the tax impact is derived primarily from the change in fuel consumption over the 60 year period. A scheme may result in changed fuel consumption due to the following reasons:

- Changes in speeds resulting in greater or lesser fuel efficiency for the same trips.
- Changes in distance travelled.
- Increased road use through induced traffic or the reduction of trip suppression.

4.31 Forecast changes to indirect tax revenues were made by the TUBA model and the value represents the change over the whole study area. The scheme was expected to increase indirect tax revenue over the 60 year appraisal period in comparison with the Do Minimum (i.e. no scheme) scenario.

4.32 To assess the outturn impact the change in fuel use along the scheme section has been calculated from observed changes to traffic flows and speeds. A corresponding calculation was performed using the forecast changes to traffic flows and speeds for the same section. The difference between the forecast and observed changes in fuel use is the applied the monetised impact on indirect tax revenues to determine an outturn impact.

Table 4-7 – Indirect Tax Revenues as a cost

| £m 2002 prices and values | Forecast | Outturn |
|---------------------------------|----------|---------|
| Change to Indirect Tax Revenues | -5.6 | -2.0 |

4.33 This evaluation shows that the outturn assessment of the indirect tax impact as a cost is lower than forecast. This is due to the fact that the forecasts assumed higher background traffic growth and hence higher indirect tax impact. The observed traffic flows on the scheme section are lower than forecast. There is only marginal improvement in speed compared to pre-scheme. A combination of these factors has resulted in lower indirect tax impact than forecast.

Present Value Costs (PVC)

4.34 A cost benefit analysis of a major scheme requires all the costs to be considered for the whole of the appraisal period and they need to be expressed on a like-for-like basis with the benefits. This basis is termed Present Value. Present Value is the value today (or at a set consistent date) of an amount of money in the future. In cost-benefit analysis, values in differing years are converted to a standard base year by the process of discounting giving a present value.

4.35 Following current Treasury Green Book guidance, calculation of the present value entails the conversion to market prices, then discounting by year. This using a rate of 3.5% for the first 30 years and 3% thereafter.

4.36 The total Present Value of Cost (PVC) as assessed when this scheme was appraised was made up of the following costs converted to present value:

- Investment costs – construction.
- Investment costs – maintenance.
- Changes to indirect tax revenues.

4.37 **Table 4-8** shows the total of the present value costs.

Table 4-8 – Summary of Forecast and Observed Present Value Costs

| Present Value Costs (£m, 2002 prices and values) | Forecast | Outturn |
|---|-------------|-------------|
| Investment costs (Construction) | 30.1 | 28.3 |
| Indirect Tax Revenue | -5.6 | -2.0 |
| Total | 24.5 | 26.3 |

4.38 It can be seen from **Table 4-8** that the outturn scheme present value costs is £26.3m compared to forecast cost £24.5m. The difference is due to the less revenue from indirect tax in the outturn.

Forecasts considered higher indirect tax revenue and this offsets a considerable proportion of the overall investment costs. These values for the costs are used in the calculation of the Benefit Cost Ratio in **Table 4-9**.

Benefit to Cost Ratio (BCR)

- 4.39 The Benefit Cost Ratio (BCR) is used as an indicator of the overall value for money of the scheme. It is the comparison of the benefits (PVB) and costs (PVC) expressed in terms of present value.
- 4.40 Schemes with a BCR greater than one have greater benefits than costs; hence they have a positive Net Present Value (NPV). The higher the BCR, the greater the benefits relative to the costs.
- 4.41 At the time of scheme appraisal, Treasury guidance was to include indirect tax as a cost. However, the most recent guidance on indirect tax impacts is to include these as a benefit, rather than a reduction in cost. This means that when a scheme leads to increased fuel consumption and hence increased tax revenue, the PVB is increased rather than the PVC being decreased. **Table 4-9** below presents the BCR for both scenarios.

Table 4-9 – Predicted vs. Reforecast BCR

| All costs in £m 2002 prices and values | Indirect Tax impact as Cost | | Indirect Tax impact as Benefit | |
|--|-----------------------------|------------|--------------------------------|------------|
| | Forecast | Outturn | Forecast | Outturn |
| PVB | 355.8 | 99.4 | 361.4 | 101.4 |
| PVC | 24.5 | 26.3 | 30.1 | 28.3 |
| BCR | 14.5 | 3.8 | 12.0 | 3.6 |

- 4.42 **Table 4-9** shows that the outturn BCR is lower than forecast largely due to the journey time benefits being significantly lower than forecast. The outturn BCR represents a return of over £3 for every £1 spent, considered to be high value for money.
- 4.43 It should be noted that the BCR ignores non-monetised impacts. In the Transport Business Case, the impacts on wider objectives must be assessed but are not monetised. The evaluation of the environmental, accessibility and integration objectives is covered in the following sections.

Wider Economic Impacts

Forecast

- 4.44 The AST (**Table 7-1**) for this scheme stated that ‘*The scheme does not affect any Regeneration Areas*’. The forecast impact of the scheme was ‘*Neutral*’.
- 4.45 The EAR for this scheme states that ‘*there was no need for an EIR (Economic Impact Report) as it does not pass through a regeneration area and thus the results were not monetised*’.

Evaluation

- 4.46 As noted in the OYA report, Southampton, together with Portsmouth and South Hampshire was designated a Priority Area for Economic Regeneration (PAER). A PAER is an area where actions and investments will be prioritised to support economic development through the improvement of the transport network and advance of environment. This will have been supported by the easing of congestion on the M27 brought about by the scheme, although the capacity constraints of the junctions still remain.
- 4.47 The scheme still provides journey time benefits at FYA, although to a lesser extent than noted at OYA due to delays at the junctions. Overall, the assessment of neutral is considered valid, as although the scheme brings about some benefits, other capacity limitations still remain in the local area.

Key Points - Economy

Present Value Benefits (PVB)

- The monetised journey time benefits are lower than forecast due to lower than expected increases in traffic and lower journey time savings. The outturn journey time benefit is £100.3m and the forecast benefits were £320.8m.
- There is no statistical evidence from the safety analysis performed at this FYA stage to imply that the scheme has had an impact on safety within the study area. Hence the safety benefit is reforecast to be £0m.
- The outturn PVB is £99.4m and lower than forecast. This reduction in PVB is due to the lower than expected benefits from journey time savings.

Scheme Costs

- The outturn investment cost is 8% lower than predicted.
- Indirect tax revenue is lower than expected. This can be attributed to the lower than expected traffic flows along the scheme section and the very minimal improvements in speed following scheme opening.

Benefit Cost Ratio (BCR)

- The outturn BCR (3.6) is lower than forecast BCR (12.0) while considering indirect tax as a benefit. This is due to the lower than expected benefits. However the scheme still represents high value for money.

5. Environment

5.1 The Environmental Statement stated that the scheme would:

“...improve the existing conditions where possible and minimise and mitigate environmental impacts on areas within and adjacent to the length of the M27 concerned.”

5.2 The Environmental Statement (ES, January 2005) stated that the scheme would:

- Ease congestion and improve journey times.
- Minimise environmental impacts due to the scheme being entirely within the existing highway boundary.

5.3 The Non-Technical Summary of the Environmental Statement stated that the scheme would incorporate measures to reduce environmental impacts including:

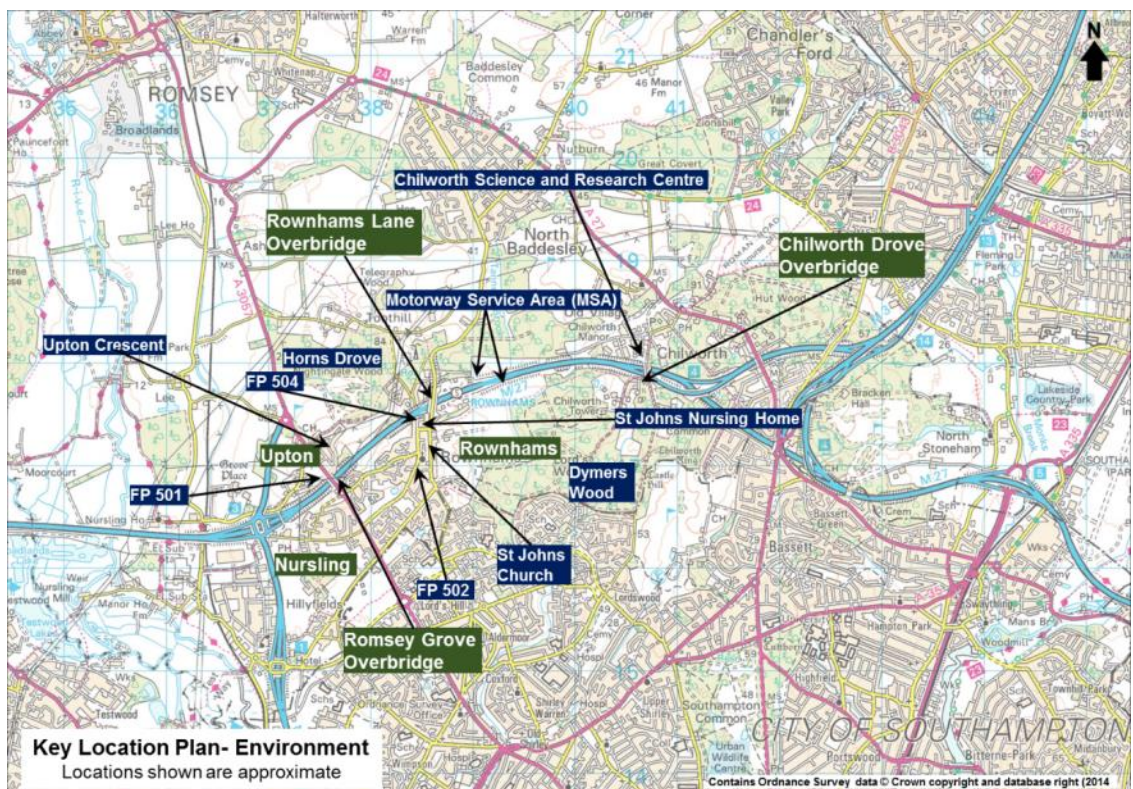
- Using quiet road surfacing to reduce traffic noise.
- Minimising loss of motorway planting and ecologically important habitat, as far as is practical.
- Upgrading of the motorway drainage system.

Introduction

5.4 This section documents the evaluation of the environmental sub-objectives, focussing on those aspects not fully evaluated at the One Year After (OYA) stage or where suggestions were made for further study.

5.5 A key location plan is provided below which serves to identify locations of sites mentioned within this chapter. (**Figure 5.1**).

Figure 5.1 – Key Location Plan – Scheme locations referenced in Environment Chapter



Summary of OYA Evaluation Recommendations

The OYA evaluation identified a number of areas where further analysis was required at the Five years After (FYA) stage to confirm the longer term impacts of the scheme on the surrounding environment, these are summarised as follows:

Noise - Traffic growth may begin to increase in the period up to 2024 and therefore it is suggested that noise is reconsidered at the five years after stage.

Air quality – As trends in air quality need to be established over relatively long periods of time, air quality should be reconsidered at the five years after stage.

Landscape – Due to the timing of the POPE site visit and restrictions for access to the verges and embankments the actual species planting could not be identified and this should be reviewed at the POPE five years after evaluation. Details of off-site planting have not been made available to the evaluation team and this should also be considered at the five years after stage. As planting stock was only one season old and appeared to be establishing satisfactorily at one year after it was considered too soon to evaluate the effectiveness of the planting measures with regard to the longer term objectives of screening and integration which should be reviewed as part of the five years after evaluation. Ongoing aftercare should be considered at the five years after stage.

Biodiversity – From the information made available to POPE it does not appear that specific monitoring of species or habitats was required as part of the scheme. This should be confirmed at the POPE five years after stage when it would be expected that the HEMP will have been finalised. It is too soon to assess the effectiveness of new planting and management regimes in relation to biodiversity and the establishment of habitat enhancement should be considered at five years after.

Heritage of Historical Resources – An archaeological design (method statement) was identified the requirement for publishing a summary of the results in an appropriate local journal. Publication of the summary in a local journal should be reviewed as part of the five years after evaluation.

Water Quality - The effectiveness of the drainage measures included in the scheme should be evaluated again at the five years after stage.

Journey Ambience – At OYA it was noted that there had been a small reduction in the number of accidents. However the actual benefit was less than predicted. As noted in the traffic evaluation section of this POPE report, one year is too short a time period to form reliable conclusions and should be reviewed at the five years after stage.

5.6 The ES concluded that there would be no major impacts resulting from the Proposed Scheme during operation including up to the Design Year. Changes were predicted to occur in relation to the following:

- Noise – possible slight ‘perceived’ benefit at year of opening, imperceptible changes in design year of 2024.
- Air Quality – slight worsening of air quality, however remaining within Statutory Air Quality Objectives.
- Ecology and Nature Conservation – initial impact from loss of habitat, mitigated by the establishment of replacement habitat.
- Landscape and Visual Impact – initial impact from widening of cuttings and embankment. Loss of vegetation and new lighting mitigated by establishment of screen planting and landscape integration.
- Water Quality – improvements to quality of discharges and reduced potential for adverse impacts from accidental spillage.
- Vehicle Travellers – reduced driver stress due to reduced congestion and improved safety.

- 5.7 The following environmental sub-objectives were appraised in the ES and in the Appraisal Summary Table (AST) according to guidance at the time (2008):
- Noise.
 - Local Air Quality.
 - Greenhouse Gases.
 - Heritage.
 - Landscape.
 - Biodiversity.
 - Water Environment.
 - Physical fitness.
 - Journey Ambience.
- 5.8 For each of these environmental sub-objectives, the evaluation in this section assesses the environmental impacts predicted in the scheme's AST and ES against those observed five years after opening.
- 5.9 In the context of the findings from the OYA evaluation and using new evidence collected five years after opening, this section presents:
- An evaluation of the ongoing effectiveness of the mitigation measures implemented as part of the scheme.
 - An updated summary of key impacts against all of the nine environment WebTAG sub-objectives, with particular focus on assessment of sub-objectives where it was too early to conclude at the OYA evaluation stage.
 - Additional analysis relevant to close out issues/ areas for further study as identified at the OYA stage for consideration at the FYA stage.

Methodology

- 5.10 This section focuses on those aspects not fully evaluated at OYA, or where at OYA, suggestions were made for further study and also any issues that have arisen since the OYA evaluation. The detail of the OYA study is not repeated here, and reference is made to the OYA report where required, although key points are incorporated into this FYA report where appropriate to provide contextual understanding.
- 5.11 No new modelling or survey work has been undertaken for this FYA environmental evaluation.

Data Collection

- 5.12 The following documents have been used in the compilation of this section of the report:
- Appraisal Summary Table, 24 July 2007.
 - M27 Junctions 3 to 4 Widening Environmental Statement (ES), November 2006, Volume 1 Text, Volume 2 Appendices and Volume 3 Figures and Non-Technical Summary.
 - M27 Junction 3-4 Widening Handover Environmental Management Plan (HEMP), Draft November 2008.
 - Environmental Commitments Register, 27 April 2009.
 - As-built drawings for Landscape Design, October 2008.
 - Handover Environmental Management Plan November 2010.
- 5.13 A full list of the background information requested and received to help with the compilation of this chapter of the report is included in **Appendix B**.

Site Visit

- 5.14 As part of the FYA evaluation, a site visit was undertaken in July 2014. This included the taking of photographs to provide comparison views with selected ES photomontages and OYA photographs. These are shown in **Appendix C**.

Consultation

- 5.15 Three statutory environmental organisations (Natural England, Historic England and the Environment Agency), Hampshire County Council, Test Valley Borough Council, Nursling and Rownhams Parish Council and Hampshire and Isle of Wight Wildlife Trust were contacted as

part of the FYA evaluation regarding their views on the impacts they perceive the road has had on the environment as shown in **Table 5-1**.

Table 5-1 – Summary of Environmental Consultation Responses

| Organisation | Field of Interest | OYA Comments | FYA Comments |
|---|--------------------------|---|---|
| Natural England | Biodiversity & Landscape | Had no comments to make on the scheme. It does not have the resources to assess the mitigation success and landscape impacts etc. | Not contacted at FYA |
| Historic England | Heritage | Do not have sufficient resources to review the scheme findings. | Not contacted at FYA |
| Environment Agency | Water | No visits or monitoring have been undertaken. It also noted that there are no recorded pollution incidents. | Response received and included in the water quality and drainage section. |
| Hampshire County Council | Biodiversity | Noted that it was content with the surveys, ecological assessment and mitigation proposals as set out in the ES. No visits to the area had been made since. | Response outstanding |
| Test Valley Borough Council | Noise & Air Quality | Noted that it was not aware of any evidence of significantly changed noise or air quality impacts since the works. | Response outstanding |
| Nursling and Rownhams Parish Council | General | Commented on general aspects of the scheme including noise, air quality, landscape and visual impact, water environment and mitigation planting. | Response outstanding |
| Hampshire & Isle of Wight Wildlife Trust | Biodiversity | The only feedback provided was in relationship to a separate scheme. | No further contact made at FYA |

- 5.16 The Area 3 Managing Agent Contractor (MAC) has been consulted with regard to animal mortality figures which have not been made available for the scheme for the five year period between 2009 and 2014 inclusive.

Traffic Forecast Evaluation

- 5.17 Three of the environmental sub-objectives (noise, local air quality and greenhouse gases) are directly related to traffic flows. No new environmental surveys are undertaken for POPE, and an assumption is made that if traffic is as expected then it is likely that local noise and air quality are as expected. Traffic levels tend to be a good indicator of noise and air quality measures.

- 5.18 The ES noted that the M27 between junctions 3 and 4 carried approximately 120,000 vehicles daily (AADT) and predicted at least a 21% increase in traffic flows by the design year 2024 (this information was based on the Forecasting report which also predicted an 8.9% increase on traffic by 2009). It was also noted in the ES that this section of the M27 had a high proportion of slow moving traffic with HGVs forming approximately 13% of the flow. These figures have been used for comparison in **Table 5-2** and **Table 5-3**.

Table 5-2 – ES Forecast vs Observed Traffic Flow (ADT)

| Location | 2006 base observed | 2014 ES forecast | Observed FYA | Observed change | % change |
|----------------------|--------------------|------------------|----------------|-----------------|----------|
| Between junction 3-4 | 120,000 | 131,200 | 125,800 | -5,400 | -4% |

Table 5-3 – ES Forecast HDV vs Observed HDV (ADT)

| Location | Base HDV | 2014 ES forecast HDV | Observed HDV | HDV difference | % difference |
|--|--------------|----------------------|---------------------|----------------|--------------|
| Between junction 3-4 (both directions) | 15,600 (13%) | 18,700 (14.3%) | 13,800 (11%) | -4,900 | -26% |

Five Years After Assessment

- 5.19 Included in this section is a brief summary of statements from the AST, ES and OYA evaluations (including close out / key issues identified for further reporting at the FYA stage) which have been included to provide the context for the FYA evaluation.

Noise

Forecast

AST

- 5.20 The AST stated that the scheme would not give rise to any perceptible changes in noise affecting nearby properties although it also stated that the number of properties experiencing noise levels over 69dB (LA10, 18hr) would increase by 1 (however it does not state which property this would be). The estimated additional population annoyed as a result of the scheme would be 5.5.

Environmental Statement

- 5.21 The ES noted that the Environmental Health Department of Test Valley Borough Council was consulted during the preparation of the assessment, as this was the only Local Authority area to fall within 300m of the relevant sections of the M27.
- 5.22 The ES noted that the study area comprised an area 300m either side of the existing motorway, between junctions 3 and 4 and that 637 dwellings were located within this area. The ES also noted that the land was primarily undeveloped (i.e. farmland and woodland) however it included parts of the residential areas of Rownhams, Upton and Nursling, the Motorway Service Area (MSA) (and motel), the Chilworth Science and Research Centre and Rownhams Park caravan site.
- 5.23 Other noise sensitive receptors within 300m of the motorway were recorded in the ES as:
- St Johns Nursing Home on Horns Drove, to the south of the M27.
 - St Johns Church on Horns Drove, to the south of the M27.
 - The satellite tracking station and Chilworth Science Park to the north of the M27.
 - The various footpaths and Public Open Spaces in the vicinity of the road.

- 5.24 The ES noted that operational mitigation would be limited to the use of the latest type of 'quieter' noise surfacing, which would be used on all lanes of the Scheme and that no other mitigation was proposed.
- 5.25 The ES stated that were the scheme not to go ahead (the Do-Minimum scenario), slight increases in noise levels of between 0.2 and 0.4dB(A) were predicted to be experienced by the year 2009, due to increases in traffic. However that by the Design Year of 2024, noise levels were predicted to fall slightly, by between -0.6 and -0.8dB(A) (based upon the assessment scenario of re-surfacing with 'quieter' surfacing but only as part of maintenance). The ES stated that overall there would be no perceptible increases in noise levels either in the Year of Opening or Design Year of 2024.
- 5.26 The ES also stated that with the scheme in place, all receptors within 300m of the motorway were predicted to have a decrease in noise levels by 2009, due to the use of the latest 'quieter' noise surface. By the Design Year of 2024, the ES stated that with the scheme in place some receptors would still experience a decrease compared with the Do-minimum, whilst others would experience an increase. However the ES concluded that the predicted increases were a maximum of 1.4dB(A) but that this was imperceptible to the human ear and so was considered to be insignificant. Overall, there were predicted to be no perceptible increases in noise levels either in the Year of Opening or Design Year of 2024.
- 5.27 The ES stated that based on the applicable criteria for the application of the Noise Insulation Regulations, no properties would be eligible for noise insulation.
- 5.28 In relation to ground-borne vibration, the ES noted that ground-borne vibration from vehicles was unlikely to represent a significant issue.

OYA Conclusions

- 5.29 A low noise surface had been used throughout the scheme as expected although the RSI value had not been confirmed to POPE. It was noted that no additional noise mitigation was proposed in the ES.
- 5.30 Comments received from the Parish Council suggested that noise was an issue at a local level. Traffic was closer to properties as a result of the scheme and was moving more quickly than before, and it was possible that noise from traffic is perceived as being worse than before the scheme.
- 5.31 The report noted that OYA observed traffic flows and HGV numbers were very similar to the pre-scheme flows noted in the ES and there had been no change to traffic volumes as a result of the scheme after opening. Journey times had decreased which was indicated by the increase in average speed which was adverse compared to pre-scheme. Although, based on traffic volume speed data at one year after the impact of the scheme on the local noise climate was potentially better than expected. However, the ES forecast for average speed in 2009 was lower than the do something scenario and POPE methodology considers that if average speed is lower than forecast by at least 10kph noise could be better than expected in the ES.

EST

- 5.32 The OYA EST noted that mitigation measures appeared to have been implemented as expected and there had been no increase in traffic as a result of the scheme. Average speed had increased from 79kph to 106kph. Forecast predictions were for speeds to increase to 119.4kph and based on POPE methodology it was likely that the local noise climate due to traffic was **better than expected**. Some concerns were raised at a local level.

Consultation

- 5.33 No consultation responses have been received regarding noise.

OYA Evaluation

- 5.34 The Road Surface Index (RSI) value of the surface used has not been provided to POPE which would confirm the noise reduction properties of the low noise surfacing used as a part of the scheme.
- 5.35 Confirmation of the ES conclusion that no properties would be eligible for noise insulation has not been received by POPE.

- 5.36 FYA observed traffic flows and HDV numbers are lower than predicted. Traffic flows are 4% less than predicted and HDV's are 26% less than predicted. Based on POPE methodology which assumes that the impact on noise as a result of traffic flows and HDV is required to be 20% less to result in a better than expected assessment, the impact on noise for the scheme, with reference to HDVs, at FYA is **better than expected**.

| Sub-Objective | AST | FYA |
|---------------|--|----------------------|
| Noise | Estimated Population Annoyed (Do Something minus Do Minimum) = 5.5 | Better than expected |

Local Air Quality

Forecast

AST

- 5.37 The AST noted that the scheme was not located within an Air Quality Management Area (AQMA), however AQMAs had been declared by Southampton City Council and Eastleigh Borough Council within 3 km of the scheme. The scheme was not predicted to lead to any measurable increases in concentrations of nitrogen dioxide (NO₂) within these AQMAs by the objective year of 2010. The assessment of total emissions showed a small increase in emissions in the Do-Something compared with the Do-Minimum scenarios.
- 5.38 The AST included quantitative measures and stated that the increases in pollutant concentrations would be less than 1µg/m³ for particulate matter (PM₁₀) and 2µg/m³ for NO₂ and the number of affected properties would be 365.

Environmental Statement

- 5.39 The ES defined the study area as including the nearest residential properties to the Scheme and also properties close to sections of nearby roads which would experience an increase in traffic as a result of the Scheme. The assessment also considered the impact on air quality in the Redbridge Road and Winchester Road Air Quality Management Areas (AQMAs) declared by Southampton City Council and the Leigh Road, Southampton Road and 'M3' AQMAs declared by Eastleigh Borough Council. The ES noted that Test Valley Borough Council had not declared any AQMAs.
- 5.40 The ES stated that no operational mitigation measures were proposed as concentrations within 200m of the scheme were predicted to continue to meet the statutory air quality objectives with the Scheme and that air quality action plans implemented by Southampton City Council and Eastleigh Borough Council would help to improve air quality within the nearby AQMAs.
- 5.41 The ES stated that the Scheme would give rise to some very small increases in pollutant concentrations. Concentrations within 200m of the scheme were predicted to continue to meet the statutory air quality objectives in the Do-Something case. By 2010, the first full year of operation of the Scheme, concentrations of all pollutants would meet the relevant limit values, at almost all locations, with the proposed scheme in place. The ES noted that the exception to this would occur along Southampton Road within the Eastleigh Borough Council Leigh Road and Southampton Road AQMA; however the exceedance in this AQMA would not be as a result of the proposed scheme.
- 5.42 The ES also noted that PM₁₀ concentrations would meet Statutory Objectives at all locations considered in the assessment, including with the Scheme in place and that, the overall impact of the scheme during both the construction and operational phases was considered to be **Minor Adverse**.

OYA

Conclusions

- 5.43 The OYA report noted that the Traffic Forecasting report concluded that flows would not be significantly affected by the scheme. The report stated that daily traffic flows had remained

similar to those predicted and that there had only been a 1% change in HDVs, although extrapolating this information against flows, it showed that there had been a reduction in HDV numbers. Average speed was forecast to increase to 119.4kph, however it had increased to 106kph (13.4kph less than forecast). Therefore it was considered that the impacts of the scheme on the different aspects of air quality were generally **better than expected**.

- 5.44 The report noted that trends in air quality need to be established over relatively long periods of time and it was recommended that air quality be reconsidered at the five years after stage.

OYA EST

- 5.45 The OYA EST noted that the traffic forecast evaluation was lower than expected with the forecast average speed approximately 13kph slower. It also noted that the HGVs had decreased by 1,164. Therefore, it was likely that impacts on air quality would be **better than expected**.

Consultation

- 5.46 No consultation responses have been received regarding air quality.

FYA Evaluation

- 5.47 At FYA, lower than predicted traffic flows (-4%) and HDV numbers (-4,900) indicate that pollutant concentrations should be lower than those estimated in the ES, which should result in a **likely to better than expected** assessment for air quality.

- 5.48 Test Valley Borough Council undertake monitoring of NO₂ as part of their local air quality management duties. They do not have any monitoring sites near the M27 between J3 and J4, but they do have one site just east of J4, in Chilworth. This monitoring site is located approximately 50 m north from the edge of the carriageway. Concentrations of NO₂ at this location are shown in **Table 5-4** for 2006 to 2013. In all cases concentrations were below the air quality criteria of 40 µg/m³. Concentrations were lowest in 2006 and highest in 2011 indicating that there has been an increase in concentrations between these years, but that concentrations have been decreasing since then. Any change is unlikely to have been caused by the scheme, as concentrations were already increasing prior to opening in 2009.

Table 5-4 – Monitored NO₂ Concentrations (µg/m³) at Chilworth, 2006 - 2013

| Site ID | OS Grid Reference | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|---------|-------------------|------|------|------|------|------|------|------|------|
| Chil 12 | 441763, 118089 | 30.3 | 33.8 | 36.2 | 37.4 | 35.6 | 38.8 | 36.9 | 35.1 |

| Sub-Objective | AST | FYA |
|-------------------|---|-----------------------------------|
| Local Air Quality | PM ₁₀ Assessment Score: +95.18 NO ₂ Assessment Score: +23.19 | Likely to be Better than expected |

Greenhouse Gases

- 5.49 The assessment of the impacts of transport schemes on emissions of greenhouse gases is one of the environment sub-objectives. WebTAG notes that carbon dioxide (CO₂) is considered the most important greenhouse gas which is therefore used as the key indicator for the purposes of assessing the impacts of transport options on climate change. Changes in CO₂ levels are expressed in terms of equivalent tonnes of carbon released as a result of the scheme.

Forecast

- 5.50 The AST stated that there would be an ‘Increase in carbon dioxide emissions with the scheme compared to the Do-minimum 2010 due primarily to increases in vehicle numbers using the road’. The increase forecast was 4,514 tonnes of CO₂, resulting from the scheme.
- 5.51 By current guidelines, greenhouse gas emissions are reported in terms of tonnes of carbon. On this basis, emissions were predicted to rise from 48,527 to 49,757 (+1,230) tonnes of carbon in the opening year.

Evaluation

- 5.52 An analysis of emissions from vehicles using the M27 scheme section has been undertaken. In order to undertake this analysis, current Design Manual for Roads and Bridges (DMRB) guidance has been used to re-forecast carbon emissions for the DM and DS scenarios using data contained in the Traffic Forecasting and Economics Report. Observed carbon emissions were calculated using the same methodology for the before and after scenarios, using flow and speed data collected for this study. As the same geographic area has been modelled for the forecast and observed scenarios, a clear comparison can be made between the data outputs. Reforecast and outturn carbon emissions are provided in **Table 5-5**.

Table 5-5 – Reforecast and Outturn Carbon Emissions (Carbon tonnes/year)

| | Reforecast | Observed |
|--|--------------------|-------------------|
| Do Minimum/Counterfactual(based on before) | 16,835 | 14,933 |
| Do-Something/Post opening | 19,702 | 16,157 |
| Net Difference | 2,867 (17%) | 1,224 (8%) |

- 5.53 It can be seen from **Table 5-5** that the outturn carbon emissions along the scheme section are lower than the forecast emissions. The five years after opening emissions are 8% higher than pre-scheme emission compared with the forecast increase of 17%. This difference is primarily due to the fact that the forecasts assumed higher traffic growth along the scheme section, whereas in the observed the traffic growth is marginal. Hence the scheme’s impact on carbon emission is better than expected, with an overall lower increase in emissions than forecast.

Landscape

Forecast

AST

- 5.54 The AST stated that no nationally important landscape designations would be affected by the scheme nor were any landscape features of county and local importance located in the study area. The increased width of road pavement and the introduction of engineering features such as lighting, additional retaining walls, gantries, and signage would exacerbate the impact of the existing motorway on the character, landform, and scale of the landscape. There would be localised adverse visual impact on views from several footpaths and properties. The scheme landscape proposals would provide additional mitigation of the widening. However removed vegetation could not be fully replaced since the proposals were restricted to the highway boundary. The overall impact was assessed at **slight adverse**.
- 5.55 With regard to Townscape the AST noted that no townscape features would be affected and the impact would be neutral.

Environment Statement

- 5.56 The ES stated that there were no designated landscapes within the study area and that the area’s landscape was generally considered to be good quality and of local importance. The ES noted that the existing motorway was lit between junction 4 and the MSA, and at junction 3, with lighting columns (18m high) mounted in the central reserve.

- 5.57 The ES also stated that the existing visual envelope (VE) for the motorway was reasonably well contained by the motorway cutting, the nature of the surrounding landform, level of woodland cover and nearby built development. The ES noted that available views were generally limited to the sections of the motorway that were located on embankment or at grade and where the existing motorway vegetation was thin. The ES noted that these types of views were available from the following locations:
- Low lying and rising open ground to the east of Rownhams on the southern side of the motorway.
 - From properties on Upton Crescent to the north of the motorway.
 - From Horns Drove to the south of the motorway.
- 5.58 On landscape impacts the ES stated that there would be no impacts on landscapes with national or local designations however there would be loss of significant vegetation along the motorway corridor, particularly on embankment areas, which would increase the severance of the landscape caused by the existing M27. The ES also stated that the increased width of road pavement and the introduction of engineering features such as additional lighting, additional retaining walls, gantries and signage would exacerbate the impact of the existing motorway on the character, landform and scale of the landscape. Overall these impacts were considered to be **Slight Adverse** at opening and also at year 15, albeit considered less severe.
- 5.59 On visual impacts the ES stated that the scheme was unlikely to open up additional views outside of the visual footprint for the existing motorway corridor and would not be particularly visually intrusive. The ES also noted that the visual amenity of a number of receptors would be adversely affected, including local roads, public rights of way and residential properties with views of the existing motorway.
- 5.60 The ES also stated that the visual effects on Public Rights of Way and recreational landscapes would range from **Moderate Adverse** to **No Change** at Opening. The visual effects on properties would range from one **Substantial Adverse** (at Lymer Cottage) to **No Change** at Opening. Generally visual impact would be expected to reduce by Year 15 as mitigation planting established and existing motorway planting matured.
- 5.61 The ES stated that the lighting proposals would increase the levels of adverse impact on properties but that the impact was likely to be limited by the location of more than 50% of the motorway being in cutting and the high level of surrounding woodland cover. Overall, the night-time impact of the proposed lighting on visual amenity was considered to be at Opening, reducing to **Slight Adverse** by Year 15. During the day-time, the visual impact of lighting proposals was considered to be less, due to the relatively unobtrusive nature of lighting columns within the context of the motorway and its structures. The ES noted that 11 new gantries were proposed as part of the Scheme (including 9 'super-span' gantries) and that these would be up-lit from the base of the sign.

Changes to the Scheme since the ES

- 5.62 The ES stated that existing central reserve lighting between junction 4 and the Motorway Service Area (MSA) would be replaced by lighting contained within the verges to both sides of the motorway and that new lighting would be introduced between the MSA and junction 3, again in both verges. Lighting between the MSA and junction 3 had not been implemented in departure from the design.
- 5.63 It was understood from Highways England that proposals for inclusion of variable speed limits were also not implemented which resulted in a reduction in the number of gantries constructed as a part of the scheme.

OYA

Conclusions

- 5.64 In general, the scheme had not resulted in any new views towards the road or significant changes to existing views. The scheme had resulted in some minor loss of verge habitats as predicted although clearance of existing trees and shrubs appeared to have been minimised. Compensation for the loss of these areas of habitat had been provided in the form of some small areas of landscape planting. Mitigation planting appeared to have been implemented as required. Several areas of re-placement planting had not been implemented although it was

concluded that this was due to the presence of more mature existing vegetation. This suggested that the approach to site clearance was adapted during the course of the works to avoid excessive or unnecessary clearance and thus replacement planting was not required. This represented a sensible approach and should be adopted where possible going forward.

- 5.65 Tree planting of a plot adjacent to the westbound MSA parking area had not been implemented; with the as-built drawings showing this area as wildflower grassland only. This change had resulted in less screening of the MSA from views from the road but did not affect views from outside the motorway corridor.
- 5.66 Cutting slopes had been treated in a variety of ways and include retained open faces as well as gabion and concrete retaining structures. The OYA report noted that this variation contributed to the visual amenity of the road corridor as well as the biodiversity value of the verges and cuttings by limiting land-take to allow the retention of existing vegetation. There was concern in the ES regarding use of appropriate retaining solutions in areas of high visibility. A variety of retaining solutions were constructed along the scheme with the consideration in the ES being taken into account where engineering restrictions allowed.
- 5.67 The increased road width and introduction of engineered features had to a limited degree exacerbated the impact of the existing motorway on the character, landform and scale of the landscape. This was largely due to the new single span gantries and newly created embankments. However impacts were considered to be as predicted in the ES (**slight adverse**) as they only influenced a limited area of the surrounding landscape character.
- 5.68 The ES predicted that lighting proposals would increase the levels of adverse impact, albeit from a limited area. New lighting between the MSA and junction 3 had not been implemented and as this was at the western end of the scheme where the majority of residential properties were located the overall impact of lighting was considered to be **better than expected**. Where new lighting proposals had been implemented, columns were relocated from the central reserve to the verges including the use of a range of column sizes with cut off lanterns which was presumed to have reduced the sky glow effect of many of the lighting columns.

EST

- 5.69 The OYA EST stated that the as built scenario appeared to have been implemented to minimise clearance of mature vegetation. Furthermore it noted that a variety of retaining structures had been implemented which would minimise vegetation loss and also protect visual amenity where appropriate.
- 5.70 Other mitigation measures had generally been provided in line with proposals. It noted that it was too soon to evaluate establishment of new planting which should be reviewed as part of the five years after report. It also confirmed that the lighting and gantry scheme had been reduced, which was beneficial although the scheme was partly within an urban area which was already lit and partly within cutting which reduced the influence of the motorway lighting.

Consultation

- 5.71 No consultation responses have been received regarding Landscape or Townscape.

FYA Evaluation

- 5.72 Comparison views with selected ES photomontages, OYA view and FYA photographs are shown in **Appendix C**.
- 5.73 The HEMP notes that a two year aftercare maintenance period was allowed for, after which the Managing Agent Contractor (MAC) would assume responsibility for maintenance. The HEMP details maintenance expectations for the scheme to ensure the landscape, visual and nature conservation requirements of the ES are met. It is noted at FYA that current maintenance undertaken by the MAC is limited to cutting visibility splays and access points only.
- 5.74 The OYA report noted that the scheme had resulted in minor loss of verge habitats with compensation planting being provided in the form of some small areas of landscape planting. The FYA site visit to assess the ongoing establishment of the planting found that growth within planting plots is slow and maintenance within the plots appears to be minimal (if any).

Figure 5.2 – Gorse, buddleja and bramble starting to overrun woodland edge planting



- 5.75 Grassland areas are not being maintained as required which is of particular concern for the 'Wild Flower Area' between the M27 and the MSA westbound. The area is being overrun by gorse, thistle, bramble and self seeded trees as indicated in **Figure 5.3**.

Figure 5.3 – Area between MSA and M27 westbound



Tanners Brook Embankment

- 5.76 The ES states that new planting consisting of a scrub belt with scattered trees along the top of the slope and to the base of the retaining wall along Tanners Brook embankments would provide some visual screening and habitat linkage and replace vegetation that was to be removed as part of the construction. The ES notes that careful management and reuse of the existing soil resource would assist integration and contribute to HABAP commitments. The ES environmental masterplan drawings confirm this requirement. It is presumed as a part of detail design development; scrub was removed as a requirement and replaced with species rich grassland with scattered trees. It is noted at FYA that the plots is being overrun by gorse, thistles and common broom with no evidence of scattered trees (see **Figure 5.4**). It is noted that visibility swathe maintenance is being undertaken.

Figure 5.4 – Views below are looking east and west adjacent to the offslip to the MSA



- 5.77 Planting plots, both woodland and grass, appear not to be receiving routine maintenance to allow establishment
- 5.78 Plant shelter removal does not appear to have been undertaken. At FYA within this scheme this is not an issue as most plants are well below their target growth for FYA and the shelters are not adversely affecting their growth.

Figure 5.5 – Woodland edge planting North West of Romsey Overbridge



- 5.79 The ES noted that the visual effects on Lymer Cottage would be **Substantial Adverse** at opening. The ES concluded that generally, visual impacts were expected to reduce by the design year as mitigation planting established, resulting in a **moderate adverse** effect on Lymer Cottage in particular. It is noted at FYA that vegetation retained is serving as an effective buffer between the motorway and Lymer Cottage et al. Retained vegetation is shown in **Figure 5.6**.

Figure 5.6 – Retained vegetation - View Romsey Road Overbridge



- 5.80 Overall, the current coverage, establishment, and condition of the plant stock indicate that the visual screening and landscape integration functions of the mitigation measures are not developing as expected. It is concluded that the intended functions of integration, screening and habitat enhancement will not be fully realised by the Design Year for this scheme without active maintenance/management.
- 5.81 It is therefore concluded that the effects of the scheme on the landscape are **worse than expected**.

| Sub-Objective | AST | FYA |
|----------------------|----------------|---------------------|
| Landscape and Visual | Slight adverse | Worse than expected |

Heritage of Historic Resources

Forecast

AST

- 5.82 The AST stated that there would be no physical impact on heritage features such as listed buildings or conservation areas and that their settings would be unaffected. The AST noted that there was potential for unknown archaeological remains to survive in areas unaffected by cuttings but that in embankment areas these will have been buried, damaged or destroyed. The impacts were assessed as **neutral** overall.

Environmental Statement

- 5.83 The ES listed specific details of designated sites located within the study area. These were summarised as follows;

- Grade I listed building of Northcliffe School (and associated Grade II buildings and structures);
- Grade II listed buildings (including Iydyne with an attached outbuilding, Rownhams House, Ice House and Stables and the Church of St John);
- Four historic parks and gardens (including Rownhams House, Grove Place, Upton House and Chilworth Manor Park).

- 5.84 The ES also noted a further thirty-six archaeological/historical sites. These were summarised as follows:

- Prehistoric sites and artefact findspots;
- The route of a Roman road crossed by the M27;
- Medieval, post-medieval and undated sites, including:
 - A cluster of archaeological sites and findspots around junction 3 consisting of Mesolithic flints, Neolithic/Bronze Age settlement features along with post medieval features and undated earthworks;
 - Prehistoric flints close to Kennels Farm;
 - A Roman road which crosses the highway to the west of junction 4.

- 5.85 The ES also stated that the historic landscape crossed by the M27 was predominantly a product of 19th and 20th century field enclosure, woodland plantation and settlement.

- 5.86 The ES stated that during the operational phase there would be no physical or visual impact upon designated sites (Scheduled Monuments, Conservation Area, Listed Buildings and Historic Parks and Gardens) caused by the Scheme. The ES noted that the Landscape Assessment established that topography, vegetation and built development visually separate the sites from the motorway.

- 5.87 The ES concluded that no designated sites would be adversely affected by the scheme. The scheme would be undertaken within Highways England land which has already been disturbed by the construction of the M27. The ES also concluded that there was still potential for unknown archaeological sites to survive in areas outside of cuttings and buried beneath embankments and that mitigation (in the form of a Rapid Open Area Excavation) would be undertaken in selected areas and if appropriate, a watching brief during construction would ensure that any archaeological remains be preserved by record. The ES stated that the overall impacts would be neutral.

OYA Evaluation

- 5.88 The OYA report noted that the scheme had, as expected, been implemented within the highway corridor with minimal disturbance and changes to existing slopes. The report stated that the influence of the motorway on the setting of surrounding historic features (such as Listed Buildings and Scheduled Monuments) was considered to be **neutral**. Furthermore, landscape and visual impacts of the scheme were largely **as expected** which supported the conclusions that topography, vegetation and built development visually separate the sites from the motorway.

OYA EST

5.89 Based on the information available it is considered that impacts are **as expected**.

FYA Consultation

5.90 No consultation responses have been received regarding heritage.

FYA Evaluation

5.91 No further evaluation has been undertaken, as limited changes regarding Heritage have been identified during the FYA site visit although it is noted that slow establishment of visual screening may impact negatively on the surrounding landscape.

5.92 The archaeologist for the scheme confirmed that given that no archaeological remains/finds or features were identified during the works it is confirmed that the Hampshire County Council Museum service agreed that no publication would be required and that the unpublished Archaeological Watching Brief report (October 2008) would be sufficient. In terms of archive, what there is has been deposited with the museum.

5.93 It is therefore concluded that the effects of the scheme on the heritage resource are generally **as expected**.

| Sub-Objective | AST | FYA |
|----------------------------------|---------|-------------|
| Heritage of Historical Resources | Neutral | As expected |

Biodiversity

Forecast

AST

5.94 The AST stated that key areas within the soft estate are those which abut or form an extension to five locally designated woodlands. The mosaic of scrub, grassland and woodland is of local importance, particularly for common reptiles. Mitigation would entail habitat enhancement to compensate for the slight loss of habitat area. An Appropriate Assessment Screening Exercise had been undertaken in relation to the Lower River Test (a designated Special Protection Areas (SPA) and Special Area of Conservation (SAC)), and the Solent and Southampton Water SPA, and Solent Maritime SAC and that English Nature agreed with the assessment as being insignificant. The impacts were assessed as **Slight Adverse** overall.

Environment Statement

5.95 The ES noted that no sites with statutory nature conservation designations were located within or adjacent to the Scheme and that the closest designated site was the River Test SSSI, approximately 1.25 km west of junction 3 (as measured along the M27 alignment). The lower part of the Test was also designated as a SPA and SAC. However, later in the assessment the ES stated that a total of five ancient semi-natural woodland SINC's abut the motorway boundary.

5.96 In relation to non-designated sites the ES noted that, in general, the soft estate between junction 3 and 4 was characterised by a mixture of planted woodland (including broad-leaved and coniferous species), semi improved grassland and scrub/tall ruderal vegetation and that adjacent habitat beyond the motorway boundary was mainly semi-improved permanent pasture or semi-natural broadleaved woodland.

5.97 The ES stated that retained areas of the soft estate outside of the construction footprint would provide resources to the invertebrate community and maintain at least some existing floral diversity in the short term, although some reduction in species and individual numbers was considered probable. However, this impact was likely to be at least partially reversible in the long term as mitigation planting matured, with a permanent loss of only 6.5% of resources. Given the likely absence of species with particular habitat requirements (for example, local BAP invertebrates), there was a high degree of confidence that representative habitat types (e.g. plantation, scrub etc) could be effectively re-created although a **Slight Adverse** impact was likely to be unavoidable.

- 5.98 The ES stated that in the early stages of the operational phase, the extent of negative effects on reptiles would be closely linked to the loss of habitats as a result of the scheme. In the short to medium term at least, the loss of resources was likely to result in a **Slight Adverse** impact although in specific locations, for example, the eastern part of the scheme, impacts were likely to be Neutral (based on retained area of habitat). As with the other features described in the ES, the operational impact was likely to be at least partially reversible in the long term as the mitigation planting matured to fulfil a similar ecological function to the existing habitats. Potential long-term impacts (> 15 years) on reptiles would be linked to cutting/management by the highway Managing Agents. Details of such management would be linked to the nature of each of the receptor sites or retained habitats. Liaison with the Managing Agents and the appointed contractor would be undertaken to advise on management of areas of retained/new habitat. One aim of future management would be the control of invasive scrub to reptile habitat, i.e. retention of grassland. Impacts on amphibians, badgers, bats and dormice were expected to be **neutral**.
- 5.99 Mitigation measures proposed in the ES for the operational phase are summarised as follows:
- A combination of targeted exclusion fencing along Tanner's Brook embankment (to prevent/reduce incidents of animal mortality).
 - Where new lighting was proposed, use of directional lighting to limit any 'spill' into retained habitat adjacent to the carriageway.
 - Limiting the use of gabions as retaining features alongside the eastbound carriageway between Kennels Farm and the eastern scheme limit wherever practicable in order to preserve the maximum area of scrub, grassland and plantation which was known to support Slow-worm, Grass Snake and Adder.
 - Replanting of any lost woodland habitat where adjacent to the SINC woodlands.
 - Enhancement of any areas of retained semi-improved grassland e.g. west of Tanner's Brook on the eastbound side.
 - Re-creation of grassland habitat throughout the Scheme using a wildflower and grass seed mix ensuring all seed used is native and appropriate to the area.
- 5.100 The following provides a summary of the key impacts identified in the ES:
- Potential long-term impacts on reptiles would be linked to cutting/management by the MAC, details of such management would be linked to the nature of each of the receptor sites or retained habitats. Operational impact of the scheme was considered to be neutral.
 - A slight adverse impact was identified for birds due to the temporary loss of habitats that would not mature and perform a similar ecological function to the existing scenario until the medium to long term.
- 5.101 Mitigation detailed as part of the ES landscape section also included planting with selected species to reflect those present and promote local biodiversity.

OYA Conclusions

- 5.102 The OYA report stated that the scheme had been implemented within the highway corridor with minimal disturbance and changes to the existing slopes of cuttings and embankments. The report noted that, based on the as-built drawings and site visits, mitigation measures outlined in the ES had been implemented as expected and included specific measures and method statements for dealing with protected species.
- 5.103 The OYA report noted that the final scheme had not significantly altered reptile habitat and that specific monitoring of species or habitats appeared not to be required as a part of the scheme.
- 5.104 The report also noted that cut off and directional lighting had been used in the scheme to limit any light spill into retained habitat adjacent to the carriageway and that the extent of the proposed lighting had been reduced from that of the original proposals.

OYA EST

- 5.105 The OYA EST noted that there had been limited disturbance to habitats and mitigation measures had largely been implemented **as expected**. Lighting proposals had been reduced. The EST noted that the establishment of habitat enhancement should be considered at five years after.

FYA Consultation

- 5.106 No response to consultation received for Biodiversity.

FYA Evaluation

- 5.107 Monitoring of reptile translocation and hibernacula appears to not have not been required as a part of aftercare maintenance. The ES stated that... *potential long-term impacts (> 15 years) on reptiles would be linked to cutting/management by the highway Managing Agents. Details of such management would be linked to the nature of each of the receptor sites or retained habitats. Liaison with the Managing Agents and the appointed contractor would be undertaken to advice on management of areas of retained/new habitat.* It is noted that maintenance of grassland required for reptile habitat within the scheme is not being maintained as advised in the ES.
- 5.108 Tree and shrub planting, as reported in the Landscape section of this chapter is not showing significant growth and their requirement in providing compensating planting for habitats lost to the construction of the scheme is not being met.
- 5.109 Invasive species, especially thistles and gorse are threatening to overrun areas of planting if left uncontrolled. The HEMP states that species such as gorse, sycamore, ash, poplar and willow should be controlled. It notes that without control they are likely to become dominant and smother other species leading to a reduction in plant biodiversity and therefore a reduction in the invertebrate population it supports.

Figure 5.7 – Woodland edge plot is being overrun by gorse, bramble and goat’s rue



- 5.110 No animal mortality figures have been received by POPE from the MAC at the time of writing this report.
- 5.111 As discussed in the landscape section, planting within the scheme is not progressing well although the planted areas are of limited extent and as such will not affect the scheme overall. Monitoring of reptiles has not been a requirement of the scheme and as such progress cannot be reported at FYA. Consequently it is concluded that the overall effects of the scheme on biodiversity are **as expected**.

| Sub-Objective | AST | FYA |
|---------------|----------------|-------------|
| Biodiversity | Slight Adverse | As expected |

Water Quality and Drainage

Forecast

AST

- 5.112 The AST stated that Tanner’s Brook and Nightingale Brook receive discharges from the motorway and that no significant impact on the baseline chemical and biological status of the water were predicted. The AST also noted that there would be no increase in flood risk and existing discharge rates would be maintained. Improvements to discharges would result from proposed use of grassed channels and vegetated ditches. New spillage containment facilities

would be introduced and new pollution control units would replace existing ones which would be under-capacity. The River Test receives outfalls from the motorway indirectly from the two receiving watercourses. No impact was predicted on the quality or quantity of water flowing into the Test, and that there would be no net impact on the hydrological regime. The impacts were assessed as **Slight Beneficial** overall.

Environmental Statement

- 5.113 The ES noted that the study area for the assessment included the M27 between junction 3 and 4, the sub-catchments of Tanner's Brook (discharging into the River Test at the Prince Charles container Port) and Nightingale Brook and the lower catchment of the River Test, below the confluence with Luzborough Lane Stream. These watercourses were included in the study area as they receive outfalls directly or indirectly from this section of the M27.
- 5.114 With regard to water quality, the ES noted that the River Test was generally good and nitrate and phosphate levels were generally moderate. Regular water quality sampling was not conducted by the Environment Agency (EA) for Tanner's Brook however historic data revealed the watercourse had 'fair' water quality at its headwaters.
- 5.115 The ES noted that there have been fourteen pollution incidents to controlled waters within 500m of the Scheme, some of which had been attributed to collisions on the M27 between junctions 3 and 4 and that these were likely to have had a significant adverse effect on water quality and aquatic wildlife. Nightingale Brook flows into Luzborough Lane Stream, which was monitored by the EA who confirmed that Luzborough Lane Stream had complied with RE2 standards (River Ecosystem) since 1997 and it had achieved a GQA (General Quality Assessment) B grade (Good) since 1990.

Changes since the ES

- 5.116 It is understood from Highways England that changes since the ES in relation to drainage have occurred. The ES refers to a number of swales (grass channels and surface flow wetlands) however these were not implemented due to issues with gradient and space. Feedback from consultation with the EA suggested that these minor changes to the scheme design did not raise any concerns.

OYA Evaluation

- 5.117 The OYA report stated that in relation to drainage and other mitigation measures no information was made available to POPE at the time which would have indicated that the drainage design was operating other than as intended and, based on the information available (including site visits and as-built drawings) it would appear that mitigation had been implemented largely as expected. Where the design had been amended and mitigation measures (i.e. surface flow wetlands) had been altered, these had not affected the overall operational design requirements of the drainage and pollution control. Based on the feedback from the EA at OYA no significant concerns over changes were made.

EST

- 5.118 The OYA EST noted that works undertaken within existing motorway corridor were implemented largely as expected, with some minor amendments due to on site conditions. The EA provided consent where necessary. No information had been provided to POPE which would indicate that the facilities were performing other than **as expected**.

FYA Consultation

- 5.119 The Environment Agency (EA) provided the following information as a part of their consultation response:
- From the incident data it is their understanding is that there does not appear to have been a significant increase or decrease in pollution incidents relating to road use since 2009.
 - Additionally, the EA has checked the only WIMs sample point downstream of the M27 on the Tanners Brook, namely G0006159 - TANNERS BROOK, LORDSHILL which is a freshwater sample point located about 1.7 km d/s of these extension works. Unfortunately the data collection from this point only started in September 2008 and so it is not possible to highlight if there has been any improvement or deterioration in the water quality of this waterbody since 2009. Finally the WFD Waterbody Summary sheet for the Tanners Brook

was last updated on 18th March 2011. Currently, the Tanner's Brook is classified as at Moderate ecological potential due to high ammonia concentrations, but is predicted to improve to Good by 2027. This will primarily be driven by a proposed restoration project. The ammonia issue is unlikely to be caused by the M27 scheme.

- During the overall pre and post scheme period, WFD physic-chemical status has changed from Moderate to Good and back to Moderate with the Moderate statuses caused each time by Ammonia exceeding WFD compliant levels. Looking at the Ammonia failures, these are driven by one-off large results – 5.3 mg/l on 30/07/2008 (which therefore effects the 2009 WFD Classification) and 7.65 mg on 31/07/2012 (which effects both 2013 and 2014 Classifications), although it is not known what has caused these large results – there are no known nearby pollution incidents associated with these. Without knowing the sources of these incidents and without bespoke monitoring above and below the Motorway, the Environment Agency cannot reliably comment on whether the scheme has had an impact – or not – on the water quality of the Tanners Brook.

FYA Evaluation

- 5.120 Further to the response to consultation received from the EA, it is clear that it would have been useful to have monitoring of water quality at discharge points within the scheme to determine whether the scheme has contributed to the raised ammonia levels within Tanners Brook. However, ammonia is not usually associated with road runoff and so the M27 is an unlikely source.
- 5.121 No information regarding the drainage system has been made available for this report and based on the consultation from the EA, it is presumed that drainage facilities are operating **as expected**.

| Sub-Objective | AST | FYA |
|----------------------------|-------------------|-------------|
| Water Quality and Drainage | Slight Beneficial | As expected |

Physical Fitness

Forecast

AST

- 5.122 The AST stated that the works would be carried out within the existing highway boundary and that there would be no permanent impacts on existing road and pedestrian crossing points. The impacts were assessed as **neutral** overall.

Environmental Statement

- 5.123 Impacts pertaining to physical fitness were covered in the 'Pedestrians, Cyclists, Equestrians and Community Effects' section of the ES. It noted that a number of Public Rights of Way lie adjacent to the site and that recreational walkers predominantly use these but that equestrians and cyclists also use the footpaths, bridleways and cycle ways. The ES also noted that there were three crossing facilities including the Chilworth overbridge, Rownhams Lane overbridge and the Romsey Road overbridge.
- 5.124 The ES stated that the Scheme would be contained within the existing motorway boundaries and that Public Rights of Way and crossing facilities would be unchanged during the construction and operational phases, that community facilities would not be affected and that the overbridges would remain unaffected by the scheme as at these sections the motorway would have no hard shoulder.
- 5.125 The ES stated that there would be no adverse impacts to pedestrians and others arising from the operational phase and that this was on the basis that landscape planting would, at year 15, largely mitigate the visual intrusion caused at the year of opening. The ES also noted that once replacement vegetation had established, it would provide screening for Public Rights of Way located close to the motorway (namely rights of way 501, 502 and 504) leading to a **Neutral** impact on the amenity of users.

OYA Evaluation

- 5.126 The OYA report noted that no post opening NMU surveys had been undertaken and no new NMU surveys had been carried out specifically for POPE that would provide any quantifiable measures of use of the Public Rights of Way (PROWs).

EST

- 5.127 The OYA EST stated that the scheme had not impacted on any of the motorway crossing points or nearby rights of way **as expected**.

FYA Consultation

- 5.128 No consultation responses have been received regarding physical fitness.

FYA Evaluation

- 5.129 On the day of the site visit users of footpaths 501, 502 and 504 were observed. They were either dog walkers or single users. The as built Planting Design drawings show that for footpaths 502 and 504, retaining walls have been used within the road corridor which has limited the need for extensive woodland removal adjacent to the footpaths. This has resulted in no increase in visual exposure of PROW users along these footpaths. Vegetation has been mostly retained between the motorway and footpath 501.

Figure 5.8 – Footpath 502 north of the motorway near Rownhams Lane



- 5.130 Based on the information presented in this evaluation, it is concluded that the effects of the scheme on physical fitness at FYA are likely to remain **as expected**.

| Sub-Objective | AST | FYA |
|------------------|---------|-------------|
| Physical Fitness | Neutral | As expected |

Journey Ambience

- 5.131 The journey ambience sub-objective considers traveller care (facilities and information), traveller views and traveller stress (frustration, fear of potential collisions and route uncertainty).

Forecast

AST

- 5.132 The AST stated that the scheme would improve signage and reduce traffic congestion which would provide an overall reduction in driver stress and that the narrower lanes would have minimal impact on fear of collisions. The AST also noted that stress might increase very slightly towards design year as traffic increased. The impact overall was assessed as **large beneficial**.

Environmental Statement

- 5.133 The ES stated that levels of driver stress was potentially high to moderate on this section of the motorway as a result of queues leading to congestion, the high percentage of HGVs and the presence of the MSA.
- 5.134 In relation to traveller views, the ES stated that the section of the M27 between junctions 3 and 4 was predominantly open countryside and woodland.
- 5.135 The ES noted the key operational phase impacts and potential for mitigation. The ES stated that mitigation in relation to driver stress during operation related to the inherent objectives of the Scheme, which included the reduction of congestion and improved safety, thereby reducing potential driver stress. In relation to views from the road, the ES noted that these were not expected to differ significantly from the existing situation once vegetation had matured and as a result no additional mitigation measures were proposed, other than landscape mitigation planting.
- 5.136 The ES stated that impacts on the views from the road in the operational phase, once landscape planting becomes established, would be of negligible significance when compared against existing conditions.
- 5.137 In relation to travellers stress during the operational phase the ES stated that the Scheme would result in a reduction of driver stress compared with the Do-Minimum scenario and that therefore, the scheme would result in a **Minor Positive impact**.
- 5.138 Traveller care would not change as a result of the scheme.

OYA Evaluation

Traveller Views

- 5.139 Overall the nature of the motorway corridor and the extents of the cutting had not been altered significantly. There has been clearance of some vegetation and mitigation planting.
- 5.140 The signage strategy for the scheme had been implemented largely as expected with changes (relocation) due to the widening and additional signage to indicate merges. Upgrades to gantry signs had been completed largely as proposed with some omissions from the scheme (due to the removal of the variable speed proposals).
- 5.141 Overall impacts on traveller's views were therefore **as expected**.

Driver Stress

- 5.142 The OYA report summarised the findings of the Traffic and Safety sections which confirmed that traffic volumes were predicted by the ES to increase although they had remained unchanged. Journey times had improved which had resulted in less variation through the day. There had been a small reduction in the number of collisions, bringing the collision rate down from slightly above the national average, to slightly below, however the actual benefit was less than predicted. As noted in the traffic evaluation section of the OYA report, the opening year was too short a time period to form reliable conclusions and should be reviewed at the five years after stage.
- 5.143 The Scheme was predicted to result in a **beneficial** effect on driver stress and it was noted that although there would be a minor positive impact, overall driver stress would remain '**high to moderate**'. Based on the information presented at OYA on the analysis of traffic flows and safety the prediction that driver stress would improve was considered **as expected**.

Traveller Care

- 5.144 As expected there had been no changes to traveller facilities as a result of the scheme which therefore remained **as expected**.

EST

- 5.145 The OYA EST noted that traveller views remained largely unaltered with traffic volumes having not increased as predicted. It stated that journey times were improved with collisions less frequent, therefore anticipated effects on driver stress were largely **as expected**.

FYA Consultation

5.146 No consultation responses have been received regarding Journey Ambience.

FYA Evaluation

Table 5-6 summarises the evaluation of the various elements of journey ambience and the scheme’s impact on this sub-objective. Overall the scheme impact is large **beneficial as expected**.

Table 5-6 – Summary of Various Journey Ambience

| Traveller Factor | Score | FYA evaluation |
|-------------------------|--|---|
| Views | Negligible As expected | Views have not changed significantly since OYA, although the expected growth of trees planted on the westbound carriageway before the MSA has not occurred allowing some views beyond the highway corridor. |
| Driver Stress | Large Beneficial As expected | Journey time improvements and predictability have reduced driver stress. Improved signage available to the traveller through the use of overhead gantries has resulted in less driver uncertainty. |
| Care | None | No additional facilities provided due to location of existing MSA within the scheme. |
| Summary Score | Large Beneficial | As expected |

Key Points – Environment

Noise

- FYA observed traffic flows and HDV numbers are lower than predicted suggesting a better than expected outcome for noise. Traffic speed data at five years after reflects a worse than expected result. Overall, although traffic speeds exceed POPE thresholds for noise, the reduction in traffic flows and HDVs results in an overall scheme assessment of as expected for noise.

Air Quality

- At FYA, lower than predicted HDV numbers (-4,900) and traffic flows (-4%) result in a better than expected assessment for air quality.

Greenhouse Gases

- The observed proportionate increase in emission as a result of the scheme is 8% whereas the re-forecast value is 17% over the scheme extent. This difference is primarily due to the fact that the forecasts assumed higher traffic growth along the scheme section, whereas in the observed the traffic growth is less than the forecast.
- Therefore it can be concluded that whilst the scheme has led to an increase in carbon emissions from vehicles travelling on the M27 scheme section, this net increase is not as high as expected.

Landscape

- The road corridor generally has not been maintained recently beyond visibility swathe cuts. Planting is not progressing as expected and is being outcompeted by invasive species such as thistles and gorse.
- The current levels of plant growth and establishment indicate that their visual screening and landscape integration functions are not developing as would be expected at FYA.

Biodiversity

- No monitoring of translocated species was undertaken as a part of the scheme, and as such, their success cannot be determined. Overall, however, despite the lack of growth within planting plots mature planting within the scheme has been retained and as such existing ecological habitat has been maintained relatively intact. Based on this it is determined that the effect of the scheme at FYA is as expected.

Heritage of Historic Resources

- Limited changes regarding Heritage have been identified during the FYA site visit although it is noted that limited establishment of visual screening may impact negatively on the surrounding landscape.
- No publication report is required for this scheme and the unpublished Archaeological Watching Brief report (October 2008) would be sufficient for submission to the Hampshire County Museum. In terms of archive, what there is has been deposited with the museum.

Water Quality and Drainage

- Information received from the EA appears to indicate that the scheme has had a limited effect on water quality within local rivers. No information regarding the drainage system has been made available for this report but based on the response from the EA it is presumed that drainage facilities are performing as expected.

Physical Fitness

- The impact on PROW has been limited due to limited vegetation clearance undertaken as a part of the scheme. Use of footpaths by pedestrians was noted during the site visit.

Journey Ambience

- The lack of maintenance on the embankment on the westbound approach to the Motorway Service Area has allowed for a more open view due to the poor growth of trees at FYA.
- Improved journey times and predictability coupled with increased information signage has reduced driver stress as predicted.

6. Accessibility and Integration

- 6.1 This chapter evaluates the impact of the scheme in terms of the accessibility and integration objectives; comparing qualitative forecast assessments from the scheme AST (as shown in **Table 7-1**) with post-opening findings and analysis of policy objectives.

Accessibility

- 6.2 The accessibility objective is concerned with how the scheme has affected the ability of people in different locations to reach different types of facilities, using any mode of transport. The accessibility objective consists of three sub-objectives. These are:
- Option values.
 - Access to the transport system.
 - Severance.

Option Values

- 6.3 Option values, as defined in WebTAG, relate to the availability of different transport modes within the study area, even if they are not used. For example, a car user may value a bus service along their route even if they never use it because they have the option of another mode should their car become unavailable.

Forecast

- 6.4 The AST stated in relation to the option values that the impact of the scheme would be 'neutral' and gave a qualitative assessment as... *'No change to option values is envisaged as part of the scheme'*.

Evaluation

- 6.5 Given the nature of the M27 widening, the consideration of transport options is not really relevant and so the neutral assessment is upheld in the evaluation.

Severance

- 6.6 Community severance refers to the degree to which movement and activities within the community are affected by the presence of a major road or other transport link, and particularly the degree of separation of residents from the facilities and services they use within their community.

Forecast

- 6.7 The AST stated that... *'No change to routes crossing the scheme'*. The assessment given was 'neutral'.

Evaluation

- 6.8 As noted at OYA, the AST assessment of neutral is upheld in the present evaluation as no routes cross the scheme.

Access to the Transport System

- 6.9 WebTAG states that access to the transport system is strongly influenced by the two key variables introduced at the start of this section, i.e. access to a private car and proximity to a public transport service.

Forecast

- 6.10 The AST stated that... *'There would be no effect on access to the transport system'*. The assessment given was 'neutral'.

Evaluation

- 6.11 As noted in the OYA report, National Express do use part of the route, but consultation at OYA noted that services were unaffected by the scheme. While the FYA evaluation is scored as neutral as the scheme does not open up public transport to any new users, there are benefits to existing users as a result of the scheme as noted in the OYA report.

Integration

- 6.12 The integration objective consists of two main elements:
- **Interchange with other transport modes:** how the scheme assists different modes of transport in working together and the ease of people moving between them to choose sustainable transport choices; and
 - **Land Use Policy and Other Government Policies:** how the scheme integrates with local land use and wider government objectives.

Transport Interchange

- 6.13 The transport interchange objective relates to the extent to which the scheme contributes towards the Government objective of improving transport interchange for passengers and freight.

Forecast

- 6.14 The AST stated that... *'The scheme would not include an interchange between different modes, or change to such an interchange'* and gave a 'neutral' assessment.

Evaluation

- 6.15 The AST assessment of neutral is upheld in the present evaluation as no interchange has been affected.

Land Use Policy

- 6.16 This section looks at the scheme in relation to national, regional and local level land use and development policies.

Forecast

- 6.17 The AST stated that... *'The key policy issues were those related to transport, such as making the best use of the existing highway infrastructure, access to ports, quality of development along transport routes, environmental issues in relation to flood prevention, effects on designated settlement character areas and incorporation of new landscape planting as part of development proposals'*. The AST gave a 'beneficial' assessment.

Evaluation

- 6.18 An evaluation of the impact of the scheme in relation to local, regional and national policy is contained in **Table 6-1**.

Other Government Policies

Forecast

- 6.19 The AST stated that... '*Few policies would be helped or hindered, apart from a conflict with the Department for Environment, Food and Rural Affairs (DEFRA) Air Quality Strategy Addendum February 2003*', and gave an '**adverse**' assessment.

Evaluation

- 6.20 The table overleaf indicates that the scheme generally aligns with a number of government policies, particularly in relation to increased capacity on the road network. No safety benefits can be claimed as a result of this scheme, however, but is balanced by the improvements related to congestion.
- 6.21 As noted in the OYA report, the addendum relates to maximum concentrations of certain pollutants. As noted in the air quality section of this FYA report, the impact of the scheme is likely to be better than expected, therefore a **neutral** score, better than expected, is considered more appropriate for this sub objective.

Table 6-1 – Scheme Alignment with National, Regional and Local Policy

| | Policy/Document | Relevant Policy Objective/Reference | Relevant Scheme Impacts | Alignment |
|-----------------|--|---|--|-----------|
| Local Policy | Hampshire Local Transport Plan (March 2006) | <ul style="list-style-type: none"> The Hampshire LTP contained a list of critical infrastructure requirements including the M27 J3-4 Widening scheme. The benefits of the scheme were expected to be a reduction in congestion, and improved access to ports/ airports. The LTP noted that “the additional lanes will not in themselves offer a significant increase in capacity to alleviate the problems on the M27. Discussions are taking place with the Highways England on further improvements particularly on the managed motorway concept...” (but these managed motorway proposals were not actually implemented). | <ul style="list-style-type: none"> The scheme has delivered congestion relief by increased road capacity to cater for growth in traffic. The scheme has improved the access to Southampton port and airport. | ✓ |
| Regional Policy | Regional Planning Guidance for the South East (July 2004) | <ul style="list-style-type: none"> At the time of scheme preparation, Regional Planning Guidance for the South East (RPG9), dated July 2004, was in force. This designated the M27 route as a ‘regional spine’, and noted that congestion was a problem. As part of the Investment Framework, the M27 J3-4 Widening scheme was listed as a measure needing further appraisal, and with a likely delivery date of 2006-10. | <ul style="list-style-type: none"> The scheme has led to improvement in journey times along with higher traffic thus helping in reducing congestion. | ✓ |
| National Policy | The Future of Transport: a Network for 2030 | <p>The Strategy builds on the progress that had already been made since the implementation of the 10 year plan for transport. This plan extended out to 2014-2015 but strategy also looks even further ahead, at the challenges we face over next 20-30 years.</p> <p>The Strategy is built around three themes:</p> <ul style="list-style-type: none"> Sustained investment; Improvements in transport management; and Planning ahead. <p>The main goal is to provide a road network that provides a more reliable and free-flowing system for motorists, other road users and businesses, where travellers can make informed choices about how and when they travel, and so minimise the adverse impact of road traffic on the environment and other people.</p> | <ul style="list-style-type: none"> The scheme has provided increased capacity to cater for growth in traffic and potential economic benefits. Journey time reliability has improved post scheme opening. | ✓ |

Key Points – Accessibility and Integration

Accessibility

- It is considered that the AST rating of neutral for the Option Values, Severance and Access to the Transport System sub-objectives is appropriate given the outturn impact of the scheme.

Integration

- The scheme has not had an impact on the provision of public transport interchange, as expected.
- The scheme integrates well with the objectives set out in regional policies and contributes to improving the reliability of the transport system in region. The scheme's impact on Land Use and Other Government Policies is therefore considered to be neutral, better than expected.

7. Appraisal Summary Table & Evaluation Summary Table

Appraisal Summary Table

- 7.1 The AST is a brief summary of the main economic, safety, environmental and social impacts of a highway scheme. **Table 7-1** presents the AST for the M27 J3-4 Widening scheme.
- 7.2 The AST presents a brief description of the scheme, a statement detailing the problems that the scheme planned to address, and makes an assessment of the scheme's predicted qualitative and quantitative impacts against the following core NATA objectives:
- **Environment** – an estimate of the impact of the scheme on factors such as noise, local air quality, landscape, biodiversity, and water.
 - **Safety** – measured reduction in the number and severity of collisions and qualitative assessment of impacts on security.
 - **Economy** – Estimated impact of the scheme upon journey times, vehicle operating costs, scheme costs, journey time reliability and wider economic impact.
 - **Accessibility** – A review of scheme impact upon access to the public transport network, community severance, and non-motorised user impact.
 - **Integration** – A description of how a scheme is integrated with wider local planning, regional and national policy objectives.

Evaluation Summary Table

- 7.3 The EST was devised for the POPE process to record a summary of the outturn impacts against the DfT's transport objectives, compared to the predictions in the AST.
- 7.4 Drawing on the results presented in this report, **Table 7-2** presents the EST for the scheme. An assessment of each of the objectives at the FYA stage is given. Where possible, the format of the EST mirrors the appearance and process of the AST to enable direct comparison of the two.

Table 7-1 – Appraisal Summary Table (AST)

| Option: M27 J3-4 Widening | | Description: Widening existing M27 between junctions 3 and 4 to D4M in both directions | Problems: Severe congestion and delay and high accident occurrence | Present value of costs to public accounts:£37.546m |
|---------------------------|--------------------------------------|---|---|---|
| OBJ | SUB-OBJECTIVE | QUALITATIVE IMPACTS | QUANTITATIVE IMPACT | ASSESSMENT |
| Environment | Noise | The scheme would not give rise to any perceptible changes in noise affecting nearby properties. There would be an increase of 1 in the number of properties experiencing noise levels over 69dB(LA10,18hr) | Estimated population annoyed: Do something 232.7. Do minimum 227.2 | Estimated population annoyed +5.5 |
| | Local Air Quality | The scheme is not located within an Air Quality Management Area (AQMA), however AQMAs have been declared by Southampton City Council and Eastleigh Borough Council within 3 km of the scheme. The scheme is not predicted to lead to any measurable increases in NO ₂ within these AQMAs by the objective year of 2010. The assessment of total emissions shows a small increase in emissions in the Do-something compared with the Do- minimum. | The increases in pollutant concentrations are all less than 1µg/m ³ for PM ₁₀ and 2µg/m ³ for NO ₂ . The number of affected properties would be 365 | Overall PM ₁₀ score +95.18 Overall NO ₂ score =23.19 |
| | Greenhouse Gases | Increase in carbon dioxide emissions with the scheme compared to the Do-minimum 2010 due primarily to increases in vehicle numbers using the road. | 2009 Do-min – 178,093 tonnes/ yr 2009 Do-something – 182,607 tonnes/ yr | +4,514 tonnes per year |
| | Landscape | No nationally important landscape designations are affected. Landscape features of county and local importance are located in the study area but would not be directly impacted by the scheme. The increased width of road pavement and the introduction of engineering features such as lighting, additional retaining walls, gantries, and signage would exacerbate the impact of the existing motorway on the character, landform, and scale of the landscape. There would be localised adverse visual impact on views from several footpaths and properties. The scheme landscape proposals would provide additional mitigation of the widening. However removed vegetation could not be fully replaced since the proposals are restricted to the highway boundary. | Not applicable | Slight adverse |
| | Townscape | No townscape features affected. | Not applicable | Neutral |
| | Heritage of Historic Resources | There would be no physical impact on any heritage features such as listed buildings or conservation areas and their settings would be unaffected. There is the potential for unknown archaeological remains to survive in areas unaffected by cuttings. In embankment areas these will have been buried, damaged, or destroyed. | Not applicable | Neutral |
| | Biodiversity | Key areas within the soft estate are those which abut or form an extension of five locally designated woodlands. The mosaic of scrub, grassland and woodland is of local importance, particularly for common reptiles. Mitigation entails habitat enhancement to compensate for slight loss of habitat area. An Appropriate Assessment Screening Exercise has been undertaken in relation to the lower River Test (a designated SPA and SAC), and the Solent and Southampton Water SPA, and Solent Maritime SAC. EN agree with the assessment as being insignificant. | Not applicable (6.5% loss of habitat area) | Slight adverse |
| | Water Environment | Tanner's Brook and Nightingale Brook receive discharges from the motorway. No significant impact on the baseline chemical and biological status of the water are predicted. There would be no increase in flood risk and existing discharge rates would be maintained. Improvements to discharges would result from proposed use of grassed channels and vegetated ditches. New spillage containment facilities would be introduced and new pollution control units would replace existing ones which would be under-capacity. The River Test receives outfalls from the motorway indirectly from the two receiving watercourses. No impact is predicted on the quality or quantity of water flowing into the Test (English Nature agree with this outcome), and there would be no net impact on the hydrological regime. | Not applicable. | Slight beneficial |
| | Physical Fitness | The proposed works would be carried out within the existing highway boundary and there would be no permanent impacts on existing road and pedestrian crossing points. | The proposed scheme would not have an effect on pedestrian or cycle trips. | Neutral |
| | Journey Ambience | The proposed scheme would provide improved signage and reduced traffic congestion, which would serve to provide an overall reduction in driver stress. The fear of accidents due to narrower lanes would have a minimal impact. Stress may very slightly increase towards Design Year as traffic increases. | Not applicable | Large beneficial |
| Safety | Accidents | Accident rates in COBA are the same for dual 3 and dual 4 motorways. The comparison is based on observed accident rates for the Do-Minimum and default rates for the Do-Something. | Accidents saved: PIA = 876. Casualties saved: Fatal = 13.3, Serious = 80.5, Slight = 1415.3 | PVB 37.575m |
| | Security | Generally unaffected by the implication of the scheme but there will be an increase in speed reducing the frequency of stationary traffic therefore a slight benefit in security to road users. | | Neutral |
| Economy | Public Accounts | - | Central govt PVC £49.8m. Local govt PVC £0m | PVC £37.546m |
| | Business Users & Transport Providers | - | Opening year time saved 54,000 veh-hrs Opening year journey time improvements 2 minutes AM peak | PVB £207.990m |
| | Consumer Users | - | Opening year time saved 193,000 veh-hrs | PVB £127.630m |
| | Reliability | Increased journey time reliability and reduced congestion would lead to a reduction in driver stress. | - | Moderate |
| | WEI | The scheme does not affect any Regeneration Areas | - | Neutral |
| Accessibility | Option Values | No change to option values is envisaged as part of the scheme | - | Neutral |
| | Severance | No change to routes crossing the scheme. | - | Neutral |
| | Access to the Transport System | The scheme will have no effect on access to the transport system | - | Neutral |
| Integration | Transport Interchange | The scheme does not include an interchange between different modes or changes to such an interchange | - | Neutral |
| | Land Use Policy | Key policy issues are those related to transport, such as making the best use of the existing highway infrastructure, access to ports and quality of development along transport routes, and environmental issues in relation to flood prevention, effects on designated settlement character areas and incorporation of new landscape planting as part of development proposals. | Not applicable | Beneficial |
| | Other Gov't Policies | Few policies are significantly helped or hindered. Hindrance to DEFRA Air Quality Strategy, addendum February 2003. | Not applicable | Adverse |

Table 7-2 – Evaluation Summary Table (EST)

| OBJ | SUB-OBJECTIVE | QUALITATIVE IMPACTS | QUANTITATIVE IMPACT | ASSESSMENT |
|---------------|--|---|--|---|
| Environment | Noise | FYA observed traffic flows and HDV numbers are lower than predicted. Traffic flows are 4% less than predicted and HDV's are 26% less than predicted. Based on POPE methodology which assumes that the impact on noise as a result of traffic flows and HDV is required to be 20% less to result in a better than expected assessment, the impact on noise for the scheme, with reference to HDVs, at FYA is better than expected. | - | Better than expected |
| | Local Air Quality | At FYA, lower than predicted traffic flows (-4%) and HDV numbers (-4,900) indicate that pollutant concentrations should be lower than those estimated in the ES, which should result in a likely to better than expected assessment for air quality | - | Likely to be Better than expected |
| | Greenhouse Gases | Along the scheme section, there is an increase in carbon emissions post opening compared to pre-scheme scenario. But the increase in emissions observed is lower than the forecast emissions. | - | Better than expected |
| | Landscape | Overall, the current coverage, establishment, and condition of the plant stock indicate that the visual screening and landscape integration functions of the mitigation measures are not developing well. It is concluded that the intended functions of integration, screening and habitat enhancement will not be realised by the Design Year for this scheme without active maintenance/management. | - | Worse than expected (Slight Adverse) |
| | Townscape | No Townscape features affected | - | N/A |
| | Heritage of Historic Resources | No physical impact on heritage features such as listed buildings or conservation areas and their settings are unaffected. | - | As expected (Neutral) |
| | Biodiversity | As discussed in the landscape section, planting within the scheme is not progressing well although the planted areas are of limited extent and as such will not affect the scheme overall. Monitoring of reptiles has not been a requirement of the scheme and as such progress cannot be reported at FYA. Consequently it is concluded that the overall effects of the scheme on biodiversity are as expected | - | As expected (Slight Adverse) |
| | Water Environment | No information regarding the drainage system has been made available for this report and based on the consultation from the EA, it is presumed that drainage facilities are operating as expected. | - | As expected (Slight Beneficial) |
| | Physical Fitness | Based on the information presented in this evaluation, it is concluded that the effects of the scheme on physical fitness at FYA are likely to remain as expected. | - | As expected (Neutral) |
| | Journey Ambience | Journey time improvements and predictability have reduced driver stress. Improved signage available to the traveller through the use of overhead gantries has resulted in less driver uncertainty. | - | As expected (Large Beneficial) |
| Safety | Accidents | There has been a reduction in the annual number of collisions without accounting for background reduction, but this is not statistically significant, therefore not monetised. | - | Worse than expected (Neutral) |
| | Security | The scheme did not affect the provision of security facilities. | - | Neutral |
| Economy | Public Accounts | Investment cost as expected. | PVC = £27.4m | Lower than expected |
| | TEE | Journey time benefits were lower than forecast. | Outturn journey time benefits: £100.3m | Lower than expected |
| | Reliability | Reduction in route stress from 91% to 76% post scheme opening. | - | As expected |
| | Wider Economic Impacts | The Southampton, Portsmouth and South Hampshire PAER will have been supported by the scheme, although network constraints elsewhere on the network will limit the impact this scheme has in isolation. | - | As expected (neutral) |
| Accessibility | Option Values | No impact on option values | - | As expected (neutral) |
| | Severance | The scheme has not affected the provision of infrastructure. | - | As expected (neutral) |
| | Access to the Transport System | No direct change in public transport provision as a result of the scheme. | - | As expected (neutral) |
| Integration | Transport Interchange | The scheme has not had an impact on the provision of transport interchange facilities. | - | As expected (neutral) |
| | Land Use Policy & Other Gov't Policies | The scheme integrates well with the local, regional and national policy. | - | As expected for land use policy (neutral). Better than expected for other government policy (beneficial) |

8. Conclusions

- 8.1 To conclude this report, this section summarises how the scheme is meeting its specified objectives.

Scheme Specific Objectives

- 8.2 **Table 8-1** presents an evaluation of the scheme’s objectives using the evidence presented in this study.

Table 8-1 – Success against Scheme Objectives

| Objective | Has the scheme objective been achieved? | |
|--|---|---|
| To provide additional capacity and reduce congestion | The widened section has provided additional capacity to cater for the traffic growth along the scheme section. | ✓ |
| To improve safety | The number of collisions has increased when accounting for background trend in collision reduction for the scheme section and wider area. However these were found to be statistically insignificant. | ✗ |
| To give improved and more reliable journey times | Large journey time savings are observed in the AM peak eastbound direction and PM peak westbound direction. There appears to be a slight increase in journey time in the AM peak westbound direction and PM peak eastbound direction. The scheme has had a moderate beneficial impact on journey time reliability. | ✓ |
| Achieve no significant worsening of the previous environmental assessments and improve on them where possible | Limited maintenance of tree, shrub and grassland plots has resulted in the deterioration of the proposed landscape and biodiversity elements of the scheme. However, reduced site clearance through limited land take and inclusion of retaining features has resulted in the retention of semi mature woodland throughout the scheme. Exclusion of lighting between the MSA and junction 3 has resulted in improved visual impacts for nearby residents. Overall, the scheme will achieve no significant worsening should maintenance regimes improve. | ✓ |

Appendices

Appendix A. Tables and Figures in this Report

Tables

| | |
|--|----|
| Table 1-1 – Chronology of the M27 Junction 3-4 Widening Scheme | 8 |
| Table 2-1 – Long Term Trends in AAWT on Motorway links around the scheme | 13 |
| Table 2-2 – Number and Proportion of HGVs on an average weekday (AWT) | 17 |
| Table 2-3 – Forecast vs. Observed Traffic Flows, Two Way AADT | 20 |
| Table 2-4 – Forecast vs. Observed Traffic Flows (no traffic growth), Two Way AADT | 21 |
| Table 2-5 – Average Journey times and savings on the M27 J3-J4 (seconds) | 22 |
| Table 2-6 – Route Stress on M27 J3-4 | 25 |
| Table 3-1 – Number of Collisions by Severity on the Key Links | 31 |
| Table 3-2 – Number of Casualties on the Key Links | 32 |
| Table 3-3 – Number of Collisions by Severity in the COBA Area | 33 |
| Table 3-4 – Number of Casualties on the COBA Area | 34 |
| Table 3-5 – Collision and Casualty Severity Index on the Key Links | 35 |
| Table 3-6 – Collision and Casualty Severity Index on the COBA Area | 35 |
| Table 3-7 – FWI on the Key Links..... | 35 |
| Table 3-8 – Comparison of Forecast and Outturn Collisions for the COBA Area | 37 |
| Table 3-9 – Forecast vs. Observed Collision Rates (PIC/mvkm) for the Key Links | 37 |
| Table 4-1 – Economic Benefits of Scheme | 41 |
| Table 4-2 – Opening Year Vehicle Hour Savings (hours) | 41 |
| Table 4-3 – Monetised Journey Time Benefits..... | 42 |
| Table 4-4 – Monetised Vehicle Operating Costs..... | 42 |
| Table 4-5 – Summary of Forecast and Observed Present Value Benefits..... | 43 |
| Table 4-6 – Summary of Investment Costs | 43 |
| Table 4-7 – Indirect Tax Revenues as a cost | 44 |
| Table 4-8 – Summary of Forecast and Observed Present Value Costs | 44 |
| Table 4-9 – Predicted vs. Reforecast BCR | 45 |
| Table 5-1 – Summary of Environmental Consultation Responses | 50 |
| Table 5-2 – ES Forecast vs Observed Traffic Flow (ADT) | 51 |
| Table 5-3 – ES Forecast HDV vs Observed HDV (ADT)..... | 51 |
| Table 5-4 – Monitored NO ₂ Concentrations (µg/m ³) at Chilworth, 2006 - 2013..... | 54 |
| Table 5-5 – Reforecast and Outturn Carbon Emissions (Carbon tonnes/year) | 55 |
| Table 5-6 – Summary of Various Journey Ambience | 68 |
| Table 6-1 – Scheme Alignment with National, Regional and Local Policy | 73 |
| Table 7-1 – Appraisal Summary Table (AST) | 76 |

| | |
|---|----|
| Table 7-2 – Evaluation Summary Table (EST)..... | 77 |
| Table 8-1 – Success against Scheme Objectives..... | 78 |
| Table B.1 – Information requested to evaluate the environmental sub-objective. | 82 |

Figures

| | |
|---|----|
| Figure 1-1 – Location of the M27 Junction 3-4 Widening Scheme | 6 |
| Figure 1-2 – Key Features of the M27 Junction 3-4 Widening Scheme..... | 8 |
| Figure 2-1 – National, Regional and Local Traffic Trends | 12 |
| Figure 2-2 – Location of Long Term Trend Count Sites..... | 13 |
| Figure 2-3 – Location of Count Sites | 15 |
| Figure 2-4 – Comparison of Pre-scheme and Post-opening AWT on and around the scheme | 16 |
| Figure 2-5 – Change in Average Weekday Hourly Flows on M27 J3-4 Eastbound | 18 |
| Figure 2-6 – Change in Average Weekday Hourly Flows on M27 J3-4 Westbound..... | 18 |
| Figure 2-7 – Average Journey Time on M27 J3-4 Eastbound..... | 23 |
| Figure 2-8 – Average Journey Time on M27 J3-4 Westbound | 23 |
| Figure 3-1– COBA model Area | 28 |
| Figure 3-2– Trends in Injury Collision Numbers | 30 |
| Figure 3-3 – Number of Collisions on Year by Year Basis for Key Links | 31 |
| Figure 3-4 – Number of Collisions on Year by Year Basis for COBA network..... | 33 |
| Figure 3-5 – Collision Locations – Pre-scheme | 36 |
| Figure 3-6 – Collision Locations – Post Opening | 36 |
| Figure 5.1 – Key Location Plan – Scheme locations referenced in Environment Chapter | 47 |
| Figure 5.2 – Gorse, buddleja and bramble starting to overrun woodland edge planting | 58 |
| Figure 5.3 – Area between MSA and M27 westbound | 58 |
| Figure 5.4 – Views below are looking east and west adjacent to the offslip to the MSA | 58 |
| Figure 5.5 – Woodland edge planting North West of Romsey Overbridge | 59 |
| Figure 5.6 – Retained vegetation - View Romsey Road Overbridge..... | 59 |
| Figure 5.7 – Woodland edge plot is being overrun by gorse, bramble and goat’s rue | 63 |
| Figure 5.8 – Footpath 502 north of the motorway near Rownhams Lane..... | 66 |

Appendix B. Data requested for Section 5: Environment

Table B.1 – Information requested to evaluate the environmental sub-objective.

| Environment Specific Requirements | OYA Response | FYA Response |
|---|--|---|
| Environmental Statement | M27 Junctions 3 to 4 Widening Environmental Statement, November 2006, Volume 1 Text, Volume 2 Appendices and Volume 3 Figures | Received at OYA |
| AST | AST version 24 July 2007 | Received at OYA |
| Any amendments/ updates/addendums etc to the ES or any further studies or reports relevant to environmental issues. Have there been any significant changes to the scheme since the ES. | No formal amendments to the ES. Significant changes to the scheme picked up through As Built drawings documentation. Significant changes included minor variations to the drainage design and reduction in lighting proposals and reduction in gantry proposals. | As noted at OYA |
| 'As Built' drawings for landscape, ecological mitigation measures, drainage, fencing, earthworks etc. Preferably electronically or on CD. | Provided on via email from Project Sponsor (drawings for landscape design only, dated October 2008) | As noted at OYA |
| Copies of the Landscape/Ecology Management Plan or Handover Environmental Management Plans | All CEMP/Hemp information obtained through Contractor and contact with Clerk of Works Environmental Commitments Register dated 27 April 2009 M27 Junctions 3 to 4 Widening Handover Environmental Management Plan (HEMP), Draft November 2008 | As noted at OYA. HEMP appendices received at FYA |
| Contact names for consultation | Sourced by the POPE team | As noted at OYA |
| Archaeology - were there any finds etc. Have any Archaeological reports been written either popular or academic and if so are these available? | Watching brief results - no finds. Watching brief report stating that archive to be stored at Hampshire County Council Museum. | Hampshire County Council Museum service agreed that no publication would be required and that the unpublished Archaeological Watching Brief report (October 2008) would be sufficient. In terms of archive, what there is has been deposited with the museum. |
| Have any properties been eligible for noise insulation? | Information not provided for the OYA stage, to be reviewed at FYA evaluation | No information provided at FYA |
| Has any post opening survey or monitoring been carried out e.g. for ecology/biodiversity or water quality and if so would copies of the reports be available? | As far as aware, no post opening or monitoring for noise, air quality or ecology | As for OYA |
| Animal Mortality Data | Limited information provided by MAC | No information provided by MAC |
| Any publicity material | Newsletters sourced from Highways England web page/ Project Sponsor | As for OYA |
| Copy of NMU post opening survey | No information available/ surveys undertaken | As for OYA |

Appendix C. ES and OYA Comparison Viewpoints

C.1.1. OYA vs FYA selected view comparisons

Figure C.1 – Mitigation planting areas, west bound at the Romsey Road overbridge

OYA view from bridge



FYA view from access route to service



Planting has not progressed significantly and at FYA it is concluded that it will not reach expected growth targets by the design year.

Figure C.2 – Seeding of Tanners Brook embankment (south)

OYA view from footpath towards embankment



FYA view from motorway looking north east along embankment



Maintenance to retain species rich embankment is not being undertaken and the area is being overrun by gorse, thistle and common broom

C.1.2. ES/OYA/FYA view comparisons

Please note – ES views have downward pointing arrows that could not be accommodated due to space restrictions. Please refer to ES volume 3.

C.1.3. 'Before' and 'After' views from Rownhams Lane overbridge

Figure C.3 – ES Figure V2-1.2 – Viewpoint 1: View looking east from the Rownhams Lane overbridge



Figure C.4 – POPE OYA view: New mesh safety fence obscures the view, however new gantries and loss of vegetation alongside the MSA are apparent



Figure C.5 – POPE FYA view: New gantries and loss of vegetation alongside the MSA remain at FYA



Figure C.6 - ES Figure V2-1.2 – Viewpoint 3: Looking south west from the Rownhams Lane overbridge



Figure C.7 – POPE OYA view looking south west from the Rownhams Lane overbridge: View illustrates changes to central reservation and introduction of MS4 VMS on the eastbound carriageways



Figure C.8 – View remains unchanged at FYA



C.1.4. 'Before' and 'After' views from from Chilworth Drove/Lordswood Lane overbridge

Figure C.9 - ES Figure V2-1.3 – Viewpoint 5: View looking west from Chilworth Drove/Lordswood Lane overbridge



Figure C.10 – POPE OYA View: Changes in gantries are the largest change in the view however relocation of lighting columns from the central reservation can also be seen



Figure C.11 – FYA view confirms locations of gantries and lighting and emphasises the loss of vegetation and lack of progress of replacement planting



C.1.5. 'Before' and 'After' views from start of footpath off Rownhams Lane (south of the M27).

Figure C.12 – Viewpoint 7: View looking north east from start of footpath off Rownhams Lane (south of the M27)



Figure C.13 – POPE OYA View: The scheme has not resulted in changes in this view



Figure C.14 – POPE FYA View: The scheme view remains unchanged



C.1.6. 'Before' and 'After' views from footpath between Rownhams Lane and Lordswood Lane

Figure C.15 - ES Figure V2-1.4 – Viewpoint 9: View looking north from footpath between Rownhams Lane and Lordswood Lane



Figure C.16 – POPE OYA View: Changes resulting from the widening scheme are perceptible in the view but do not form a major change in view



Figure C.17 – FYA View: view shown at FYA is slightly closer to the scheme along the PROW and demonstrates the visibility of the scheme as progress is made along the footpath.



C.1.7. 'Before' and 'After' views from permissive footpath to Kennels Farm

Figure C.18 - ES Figure V2-1.4 – Viewpoint 11: View looking south west from permissive footpath to Kennels Far



Figure C.19 – POPE OYA View: The permissive route is no longer open and therefore this view is taken from a representative location; comparable changes are not evident from the location



Figure C.20 – M27 is located behind the line of trees as indicated; view is taken looking south towards the easterly carriageway near the Chilworth Drove overbridge adjacent to the Chilworth Science and Research Centre



C.1.8. 'Before' and 'After' views from footpath at edge of Dymer's Wood

Figure C.21 - ES Figure V2-1.4 – Viewpoint 12: View looking north west from footpath at edge of Dymer's Wood



Figure C.22 – POPE OYA View: The widening scheme has not resulted in changes to the width or density of screening vegetation in this location



Figure C.23 – POPE FYA View: Views remain the same as at OYA.



C.1.9. 'Before' and 'After' views from Romsey Road overbridge

Figure C.24 - ES Figure V2-1.5 – Viewpoint 13: View looking north east from Romsey Road overbridge



Figure C.25 – POPE OYA View: The new gantry structure is now dominant in the view however retaining structures, loss of vegetation and mitigation planting can all be seen



Figure C.26 – POPE FYA View: View remains similar with existing vegetation showing progress, but scheme planting remaining below expected growth targets



C.1.10. 'Before' and 'After' views from Romsey Road overbridge

Figure C.27 - ES Figure V2-1.5 – Viewpoint 14: View looking south west from Romsey Road overbridge



Figure C.28 – POPE OYA View: View illustrates new retaining structure but also how clearance of vegetation to facilitate the widening was kept to a minimum



Figure C.29 – POPE FYA View: Lack of progress of planting remains visible



C.1.11. 'Before' and 'After' views from access road to Parkers Farm

Figure C.30 – Viewpoint 15: View looking north east from access road to Parkers Farm



Figure C.31 – POPE OYA View: The view illustrates very minor changes resulting from clearance of vegetation along the motorway, this is evident in the view a change in colour and texture of vegetation



Figure C.32 – POPE FYA View: The view remains similar at FYA



C.1.12. 'Before' and 'After' views from Paulet Lacave Avenue, Nursling

Figure C.33 - ES Figure V2-1.6 – Viewpoint 16: View looking north from Paulet Lacave Avenue, Nursling



Figure C.34 – POPE OYA View: Clearance of vegetation in the motorway corridor has, very slightly, increased visibility of passing vehicles (seen beyond dead tree)



Figure C.35 – POPE OYA View: Romsey road overbridge has been mostly obscured from view due to existing vegetation growth



Appendix D. Glossary

| Terms | Definition |
|---------------|--|
| AADT | Annual Average Daily Traffic. Average of 24 hour flows, seven days a week, for all days within a year. |
| Accessibility | Accessibility can be defined as 'ease of reaching'. The accessibility objective is concerned with increasing the ability with which people in different locations, and with differing availability of transport, can reach different types of facility. |
| ADT | Average Daily Traffic. Average daily flows across a given period. |
| AST | Appraisal Summary Table. This records the impacts of the scheme according to the Government's five key objects for transport, as defined in DfT guidance contained on its Transport Analysis Guidance web pages, WebTAG. |
| AAWT | Annual Average Weekday Traffic. As AADT but for five days (Monday to Friday) only. |
| AWT | Average Weekday Traffic. As ADT but for five days (Monday to Friday) only. |
| BCR | Benefit Cost Ratio. This is the ratio of benefits to costs when both are expressed in terms of present value i.e. PVB divided by PVC. |
| Bvkm | Billion Vehicle Kilometres |
| COBA | Cost Benefit Analysis. A computer program which compares the costs of providing road schemes with the benefits derived by road users (in terms of time, vehicle operating costs and accidents), and expresses the results in terms of a monetary valuation. The COBA model uses the fixed trip matrix unless it is being used in Accident-only mode. |
| DfT | Department for Transport |
| Discount Rate | The percentage rate applied to cash flows to enable comparisons to be made between payments made at different times. The rate quantifies the extent to which a sum of money is worth more to the Government today than the same amount in a year's time. |
| Discounting | Discounting is a technique used to compare costs and benefits that occur in different time periods and is the process of adjusting future cash flows to their present values to reflect the time value of money, e.g. £1 worth of benefits now is worth more than £1 in the future. A standard base year needs to be used which is 2002 for the appraisal used in this report. |
| DM | Do Minimum. In scheme modelling, this is the scenario which comprises the existing road network plus improvement schemes that have already been committed. |
| DMRB | Design Manual for Roads and Bridges |
| DS | Do Something. In scheme modelling, this is the scenario detailing the planned scheme plus improvement schemes that have already been committed. |
| EA | Environment Agency |
| EAR | Economic Assessment Report |
| ES | Environmental Statement |
| EIR | Economic Impact Report |
| EST | Evaluation Summary Table. In POPE studies, this is a summary of the evaluations of the TAG objectives using a similar format to the forecasts in the AST. |
| FYA | Five years After |
| HA | Highways Agency. An Executive Agency of the DfT, responsible for operating, maintaining and improving the strategic road network in England. Since April 2015, now known as Highways England, working as a company independent of DfT. |
| HGV | Heavy Goods Vehicle |
| KSI | Killed or Seriously Injured. KSI is the proportion of casualties who are killed or seriously injured and is used as a measure of accident severity. |
| LNS | Low Noise Surfacing |

| Terms | Definition |
|---------------|---|
| MAC | Managing Area Contractor Organisation normally contracted in 5-year terms for undertaking the management of the road network within a Highways England area. |
| MVKM | Million Vehicle Kilometres |
| NMU | Non-Motorised User. A generic term covering pedestrians, cyclists and equestrians. |
| NRTF | National Road Traffic Forecasts. This document defines the latest forecasts produced by the Department of the Environment, Transport and the Regions of the growth in the volume of motor traffic. At the time this scheme was appraised, the most recent one was NRTF97, i.e. dating from 1997. |
| ONS | Office for National Statistics |
| OYA | One Year After |
| PAER | Priority Area for Economic Regeneration. An area where actions and investments will be prioritised to support economic development through the improvement of the transport network and advance of environment. |
| PIC | Personal Injury Collision |
| POPE | Post Opening Project Evaluation. The before and after monitoring of all major highway schemes in England. |
| Present Value | Present Value. The value today of an amount of money in the future. In cost benefit analysis, values in differing years are converted to a standard base year by the process of discounting giving a present value. |
| PVB | Present Value Benefits. Value of a stream of benefits accruing over the appraisal period of a scheme expressed in the value of a present value. |
| PVC | Present Value Costs. As for PVB but for a stream of costs associated with a project |
| RSA | Road Safety Audit |
| RSI | Road Surface Index |
| SAM | Scheduled Ancient Monument |
| SSSI | Site of Special Scientific Interest |
| STATS19 | A database of injury accident statistics recorded by police officers attending accidents. |
| TEE | Transport Economic Efficiency |
| TEMPRO | Trip End Model Program. This program provides access to the DfT's national Trip End Model projections of growth in travel demand, and the underlying car ownership and planning data projections. |
| TRADS | Traffic Flow Data System. Database holding information on traffic flows at sites on the strategic network. |
| UK | United Kingdom |
| webTAG | DfT's website for guidance on the conduct of transport studies at http://www.webtag.org.uk/ |

