

## Appraisal methodology

# How we assessed and predicted existing and future traffic flows

A new traffic demand model was developed specifically for the current A27 Chichester Bypass Improvement Scheme. It took into account the following:

Travel patterns collected from anonymised mobile phone data.

Traffic counts on all major roads measured including some from West Sussex County Council in 2014.

Journey times measured on all routes to/from and through Chichester in 2014.

Department for Transport (DfT) demand data in 2014.

The traffic model has been developed in accordance with industry standards (known as WebTAG). We assess each option based on:

- Traffic forecasts for the 2020 (opening year), 2035 (design year) and 2041 (future year).
- An 'uncertainty log' to capture potential housing and economic growth from West Sussex County Council, Chichester District Council, other local authorities and private enterprises.

### DfT a conversion of a variable traffic arouth

DfT assumptions of overall traffic growth.

Variable demand modelling to take into account increase in road users after scheme completion unrelated to growth or existing demand to WebTAG standards.







## Appraisal methodology

### How we completed our economic assessment

Economic benefits come from:

- Reduction in journey times.
- Reduction in accidents.
- Reduction in vehicle operating costs.



Economic disadvantages can be caused by:

- Construction delays.
- Increased journey times.
- Changes in indirect taxation.

An economic assessment was undertaken to quantify the costs and benefits of each option.

An Economic Assessment Report (EAR) is produced to present:

- Evidence of which options provide good value for money, expressed as Benefit to Cost Ratio (BCR).
- Evidence of improved economic efficiencies for road users (e.g. commuters and business) and transport providers.
- Evidence of improved reliability in relation to journey times.

The EAR provides a comparative, quantifiable analysis of options based on an option-level BCR.

We assess the potential economic impact of each option over a 60 year period.





## Appraisal methodology summary

How we completed our economic assessment

- Costs
- Construction
- Land
- Preparation
- Supervision

### Maintenance

### (road users)

**Benefits** 

- Travel time
- Vehicle operating costs
- Accident impacts
- Changes to indirect taxation
- **Construction delay**
- Maintenance delay
- Reliability

### **Environmental impacts** Emissions

### Noise

### **Economic assessment results**

Transport Economic Efficiency (TEE) **Benefits Cost Ratio (BCR)** 

Details can be seen on the *benefits* and *effects* of different options board

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### Environmental assessment methodology

# How we assessed environmental effects and mitigation

Air quality	We have carried out air quality modelling to assess traffic volumes, patterns and changes and how these could affect key receptors. We have also considered the Area Quality Management Areas at Stockbridge, St Pancras and Orchard Street.
Cultural Heritage	We have considered the important archaeology and heritage features of the area, such as

	Fishbourne Palace and Roman Roads, Chichester Dykes, Boxgrove Priory, Goodwood Estate, and the numerous listed buildings.
Landscape	We have assessed all the landscapes, such as the South Downs National Park and Chichester Harbour Area of Outstanding Natural Beauty, and key viewpoints such as the Trundle and Chichester Cathedral.
Nature conservation	We have carried out extended habitat surveys, which have identified key habitat types and protected species, to enable targeted surveys in the next stage. Potential impacts on the designated sites in Chichester Harbour and further away have been considered.
Geology and soils	This has assessed the underlying geology and soils that could be affected. We have identified any areas of potential contaminated land, such as the historic landfills along the A27 and the former fuel depot at Bognor roundabout.
Materials	We have assessed potential effects associated with the transportation of materials and imports of primary aggregates and/or fill material. Exports of surplus waste material have been identified for all route options.
Noise and vibration	This relates to traffic patterns, volumes and type of vehicles. We have carried out noise modelling and produced noise contours to show changes in noise that could be expected as a result of the options, and suggested proposed mitigation measures such as noise barriers and low noise road surfacing.
Effects on all travellers	We have assessed potential impacts on non-motorised users (pedestrians, cyclists, equestrians and vulnerable users) and the facilities that they use. This will enable alternative and enhanced access routes to be provided, where required.

Communities and private assets Our assessment has identified potential effects on residential and commercial property, communities and agricultural land. We have also carried out an economic assessment of the potential impacts of the scheme.

Road drainage and the water environment

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We have assessed potential effects on the River Lavant, Chichester Canal, Chichester Harbour, the lakes and rifes to the south and east, and the important chalk aquifer. Our assessment has considered flood risk and the Lavant Flood Alleviation Scheme, water quality and ecology.



### How we appraised environmental effects and mitigation

	Options development					Construction	
Project stages	Options identification	Options selection	Preliminary design	Statutory procedures and powers	Construction preparation	Construction, commissioning and handover	End
	Environmental Scoping Reports	Environmental Study Reports	Environmental Impact Assessment				
Environmental assessment at each stage	Assessed the long-list of 20 options, determining which environmental topics needed to be considered further in Stage 2. No topics were scoped out and assessments have been carried out for all 10 topics summarised in the 'How we appraised environmental effects up to this stage' board.	<text><text><text></text></text></text>	<text><text><text></text></text></text>	During the period when the Planning Application or Development Consent Order application is being determined, we will continue discussions with Statutory Environmental Bodies about proposed mitigation measures and other licensing arrangements. We will also continue ecological surveys during this time. The Outline Environmental Management Plan will be updated to form the Construction Environmental Management Plan.	Advanced environmental site works, such as trapping and relocation of protected species, or advanced planting would be carried out. We would also continue ecological surveys during this time. Discussions with Chichester District Council's Environmental Health Officers would continue, to agree any limits on noise levels during construction.	Environmental control of the works would be via the Construction Environmental Management Plan, which would place strict controls on methods and timings of works.	<text></text>
Traffic and ecor	nomic	consult	ation				

appraisal methodology shown on other displays

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## Appraisal methodology



## Options interim review

### **Options review in February 2016**

- In February 2016, it was decided to rule out new routes to the north or the south of Chichester. These were found to exceed the scheme budget. Two additional options were developed at this time.
- We are consulting on options that can meet our objectives to improve traffic flow and safety, starting with options that comply with the Road Investment Strategy and fit within the £100 million to £250 million budget range for this scheme.
- The main objective is to provide the best improvement option for road users, residents and businesses of Chichester and conforms with the announcement of the scheme in the Government's 2015-2020 Road Investment Strategy.
- The options consulted on consider various junctions improvements as illustrated below:

Option name	Type/description
Option 1	Grade separation at 2 junctions (Fishbourne and Bognor) and restricted access at others.
Option 1A	Grade separation at 2 junctions (Fishbourne and Bognor), restricted access at Oving junction only. No works at Stockbridge or Whyke.
Option 2	Grade separation at 2 junctions (Fishbourne and Bognor) and restricted access at others plus closures at Stockbridge and Whyke (only north – south movements retained). New Stockbridge link road from Fishbourne to B2145.
Option 3	Junction improvements with traffic signals at majority of junctions (except Portfield) and some restricted access.
Option 3A	Junction improvements with traffic signals to Fishbourne, Stockbridge and Whyke, grade separation at Bognor Road. Widening to 3 lanes between Fishbourne and Bognor Road. No works at Oving or Portfield.



Refer to the next display boards and visualisation films for indicative design layouts of each these options



Goodwood Motor Circuit

Hedgerow with trees



A27 Scheme: option 1





Goodwood Motor Circuit

Hedgerow with trees



## A27 Scheme: option 2 Indicative design









## The benefits and effects of the different options

Feature	Option 1	Option 1A	Option 2	Option 3	Option 3A			
Air quality	Not significant beneficial effects as several properties in the St Pancras AQMA would experience improvements, however there would be a deterioration in air quality at Stockbridge AQMA, where NO <sub>2</sub> levels would slightly increase.	Not significant beneficial effects as several would be improved air quality in the St Pancras AQMA, although several properties in the Stockbridge AQMA would experience a deterioration in air quality, with increased NO <sub>2</sub> levels.	Not significant beneficial effects as there would be an overall benefit to air quality, with several properties in the St Pancras AQMA experiencing benefits from reduced NO <sub>2</sub> levels.	Not significant beneficial effects as several properties in the St Pancras AQMA would experience improvements, however there would be a deterioration in air quality at Stockbridge AQMA, where NO <sub>2</sub> levels would slightly increase.	Not significant beneficial effects as several properties in the St Pancras AQMA would experience improvements, however there would be a deterioration in air quality at Stockbridge AQMA, where NO <sub>2</sub> levels would slightly increase.			
Cultural heritage	Significant adverse effects on Fishbourne Conservation Area and the setting of 4 Grade II Listed buildings, and the AoNB from the proposed flyover at Fishbourne junction.	Significant adverse effects on Fishbourne Conservation Area and the setting of 4 Grade II Listed buildings, and on the AoNB from the proposed flyover at Fishbourne junction.	Significant adverse effects on Fishbourne and Chichester Conservation Areas, the setting of 5 Grade II Listed buildings, and the AoNB from the proposed flyover at Fishbourne junction.	No significant effects upon the historic environment anticipated.	Significant adverse effects on Chichester Conservation Area.			
Landscape	Significant adverse effects due to proposed flyovers at Fishbourne and Bognor junctions.	Significant adverse effects due to proposed flyovers at Fishbourne and Bognor junctions.	Significant adverse effects due to proposed SLR and flyovers at Fishbourne, Stockbridge, Whyke and Bognor junctions.	Only limited effects anticipated.	Significant adverse effects due to proposed flyover at Bognor junctions.			
Nature conservation	Significant adverse effects on Chichester Gravel Pits and Leythorne Meadow SNCI, and Fishbourne Meadow SNCI.	Significant adverse effects on Chichester Gravel Pits and Leythorne Meadow SNCI, and Fishbourne Meadow SNCI.	ects on Chichester e Meadow SNCI, and adow SNCI.		Significant adverse effects on Chichester Gravel Pits SNCI.			
Geology and Soils	There is conta	minated land associated with the historic landfills	along the route of the A27 between Bognor and P	ortfield junctions, and the historic fuel depot at Bo	ognor junction.			
Materials	Effects associated v	with the transportation of materials and imports of	primary aggregates and/or fill material, and expor	ts of surplus waste material have been identified	for all route options.			
Noise and vibration	There would an overall reduction in noise levels, due to the implementation of mitigation measures such as noise screening and thin course road surfacing, which can reduce noise levels.	There would an overall reduction in noise levels, due to the implementation of mitigation measures such as noise screening and thin course road surfacing, which can reduce noise levels.	There would an overall reduction in noise levels, due to the implementation of mitigation measures such as noise screening and thin course road surfacing, which can reduce noise levels.	Lower potential for changes to noise levels, due to the limited scale of the improvement works.	There would an overall reduction in noise levels, due to the implementation of mitigation measures such as noise screening and thin course road surfacing, which can reduce noise levels.			
Effects on all travellers	Not significant adverse effects on public rights of way and drivers due to construction works being carried out while the A27 remains open. However, any loss of PRoW or crossing facilities would be replaced where possible, to reduce severance caused by the A27. Safety is a primary consideration when designing new non-motorised user facilities.							
Community and private assets	Significant adverse effects are anticipated in terms of community severance and private assets, with the anticipated loss of 5 buildings.	Significant adverse effects are anticipated in terms of community severance and private assets, with the anticipated loss of 5 buildings.	Significant adverse effects are anticipated in terms of community severance and private assets, with the anticipated loss of 20 buildings.	Significant adverse effects are anticipated in terms of community severance and private assets, although no buildings would be lost.	Significant adverse effects are anticipated in terms of community severance and private assets, with the anticipated loss of 2 buildings.			
Road drainage and water environment	There are areas of Flood Zone 3 along the proposed route at Stockbridge and Portfield junctions, with Flood Zone 2 located at Whyke, Bognor and Portfield junctions. Finished road levels would therefore ensure no flooding of the carriageway and no blockage of flow paths that may increase flooding elsewhere. Potential effects on water quality would be managed by pollution prevention and best practice construction methods.							
Construction duration	41 months	23 months	41 months	15 months	27 months			
Construction costs	£182 million	£139 million	£280 million	£47 million	£172 million			
BCRs (benefit to cost ratio)	2.5	2.5	2.7	4.1	2.3			
Value for money	High	High	High	High	High			
Average peak journey change on A27 (minutes)	-4 mins 23 secs	-2 mins 58 secs	-5 mins 40 secs	-2 mins 55 secs	-4 mins 5 secs			
On local routes (minutes)	-1 mins 22 secs	-1 mins 9 secs	-2 mins 10 secs	-0 mins 22 secs	-1 mins 14 secs			

### Glossary

AQMA - Air Quality Management Area NO<sub>2</sub> - Nitrous Oxide SNCI - Site of Nature Conservation Importance SLR - Stockbridge link road

Flood Zone 2 - Areas with a 1%-0.1% chance of river flooding, or a 0.5%-0.1% probability of sea flooding, in any one year Flood Zone 3 - Areas with a >1% or greater chance of river flooding, or a >0.5% greater chance of sea flooding in any one year

nticipated in	Significant adverse effects are anticipated in
and private	terms of community severance and private
ould be lost.	assets, with the anticipated loss of 2 buildings.



We identified 4 different types of trips for vehicles travelling on the A27 Chichester Bypass:

- 12% **local trips**, with an origin **and** destination within the Chichester district.
- 42% other local trips, with an origin or destination within the Chichester district.
- 36% through traffic, with an origin and destination outside the Chichester area and travelling on the A27 throughout the district.
- 10% of other through traffic, with an origin and destination outside the Chichester area, and travelling on the A27 for part of their journey.

A summary of the journey time changes along 5 different routes (see map), showing the average improvement in 2035, compared to the 'do-minimum' scenario:

Route	Distance (miles)	2014 journey time (minutes)	Journey time under 'do minimum' scenario (minutes)	Difference from 'do-minimum' journey time (minutes)				
				Option 1	Option 1A	Option 2	Option 3	Option 3A
Route 1	7.8	13.6	17.0	-26%	-17%	-33%	-17%	-24%
Route 2	2.8	10.6	13.4	-23%	-26%	-14%	-12%	-17%
Route 3	3.2	10.0	11.6	-2%	+6%	-21%	+2%	-3%
Route 4	2.0	6.8	7.8	-1%	+10%	-20%	+1%	-3%
Route 5	5.0	12.5	14.9	-14%	-17%	-19%	-2%	-15%
Average saving (All Routes)			-13%	-9%	-21%	-5%	-12%	
Average saving (Routes 2 – 5)			-10%	-7%	-19%	-2%	-9%	
Maximum saving			-26%	-26%	-33%	-17%	-24%	

- The 'do-minimum' scenario reflects journey times should no scheme be built. It includes the works to Portfield and Oving junctions as part of the committed Shopwhyke Lakes development.
- Times given are an unweighted average of AM and PM peak periods in both directions.
- Negative figures indicate a decrease in journey time (shown in green), positive figures indicate an increase (shown in red).

## Results of the traffic modelling







### What happens next



- Preferred route announcement
- Develop the preliminary design based on the preferred route
- Publish statement of community consultation

2017 - 2018

Public consultation

2017 (dates tbc)

 Development Consent Order (DCO) application submitted to the Planning Inspectorate (PINS)
DCO application accepted
DCO application examined
Secretary of State decision on DCO application

