



Norfolk County Council

Planning & Transportation

A140 Long Stratton Bypass

Major Scheme Business Case

July 2005

Prepared by Technical Group

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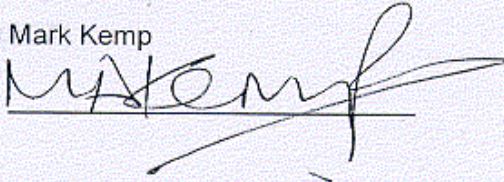
A140 Long Stratton Bypass
Major Scheme Business Case

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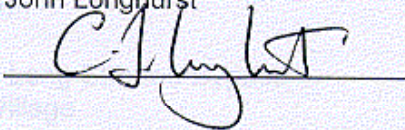


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File Reference: R2C091

Issue Status: Final

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Executive Summary

Scheme name: A140 Long Stratton Bypass

Promoter: Norfolk County Council

Description: The proposed scheme is shown in schematic form in Figure 3.2, and in more detail on the scheme plans in Appendix A. At the southern end of the scheme for the first 0.5km the new road would be a single carriageway 7.3m wide with verges to either side a minimum of 2.5m wide. The road would then be upgraded to dual carriageway for the remaining 4.3km of its length. The dual carriageway would comprise two 7.3m wide carriageways, 1.0m wide hard strips with verges to either side a minimum of 2.5m wide. A central reserve a minimum of 2.5m wide would separate the two carriageways. New roundabout junctions would be provided at both ends of the dual carriageway section of the bypass.

Traffic calming measures would be introduced along the bypassed section of the A140 through the village as an integral part of the proposed scheme. Measures would be developed in consultation with local stakeholders to be implemented immediately following the opening of the bypass.

Scheme cost: £19.92 million in 2005 prices (excluding risk allowance). £22.44 million including a risk allowance of 15%.

The cost of the scheme with a 15% risk allowance and an additional 18% Optimism Bias uplift is £26.48 million.

Aims and objectives:

There are particular environmental difficulties caused by the passage of traffic through the village:

- The existing road through the village is substandard in both width and alignment.
- The historic core of Long Stratton along the A140 is designated a conservation area.
- Narrow sections of carriageway and footways give rise to unsatisfactory conditions for pedestrians and cyclists.
- Within the built-up area there are a number of road junctions one of these is signal controlled, and one signal controlled pedestrian crossing. Most of the junctions do not meet current standards for layout and visibility. A 30 mph speed restriction on the A140 through the centre of the village exists between Lime Tree Avenue and St. Michael's Road. 50mph zones extend either side of the 30mph restriction for approximately 700m to the north and 900m to the south.
- The current speed restrictions, signal controlled junction and pedestrian crossing act to slow down traffic within the built up area, creating a pinch point and delays on the route with resultant traffic congestion, noise, pollution and safety issues.

The key scheme objective is to remove/reduce through traffic from the built-up area of Long Stratton.

A scheme is identified for investigation and implementation within the Norfolk County Council Structure Plan Policy T9.

With regard to the 4 shared priorities, the project will have a beneficial impact in terms of reducing interurban congestion in Long Stratton. This in turn should confer local air quality and quality of life benefits to the residents of Long Stratton. There will be road safety benefits and there may also be accessibility benefits by way of more reliable bus services due to the removal of the congestion problem in Long Stratton.

Appraisal summary: The Appraisal Summary Table indicates that environmental impacts are generally slightly adverse or neutral. There are beneficial safety implications, economic impacts are generally beneficial, accessibility impacts are beneficial, and integration impacts are slightly beneficial.

Economics: The economic assessment results in total Present Value of Costs of £19.6 million, total Present Value of Benefits of £77.9 million, Net Present Value of £58.3 million and Benefit to Cost Ratio of 3.980

Procurement: The project would be procured through Norfolk County Council's Strategic Partnership with contractor May Gurney and consultant Mott MacDonald. Early Contractor Involvement (ECI) will thus be possible to ensure the most advantageous working practices by utilising the contractors knowledge and experience at the most appropriate times in the design process. This accords with the principles of Rethinking Construction for which Norfolk has been awarded Beacon status.

Appraisal Summary Table - Proposed Scheme

Option	Description	Problems	Present Value Cost	
A140 Long Stratton Bypass	Approximately 5km length of carriageway of which three quarters will be dualled passing to the east of the village of Long Stratton, with connections to the existing road network via roundabouts at either end of the scheme. Two all purpose over bridges and cycle/pedestrian over bridge.	Congestion in the centre of Long Stratton with associated noise, air quality and safety issues. Status: Primary principal road Current traffic flow: approx. 18000 vehicles/day. Current %age of HGV: approx. 9%.	PVC to public accounts: £19.6m	
OBJECTIVE	SUB-OBJECTIVE	QUALITATIVE IMPACTS	QUANTITATIVE MEASURE	ASSESSMENT
ENVIRONMENT	Noise	The total estimated population annoyed within the study area declines by almost 50% in the do something scenario. Properties located directly adjacent to the existing A140 will experience the greatest noise benefits due to lower traffic flows. There will be some minor to substantial increases in noise levels at properties located near to the proposed scheme.	Do Minimum Population Annoyed: 221 The Scheme Population Annoyed: 113	Moderate beneficial The estimated population annoyed by road traffic noise in Long Stratton is expected to decrease by 108 people (49%) as a result of the scheme
	Local Air Quality	Overall improvement in air quality due to removal of traffic from the centre of Long Stratton where high numbers of properties are within 200m of the existing A140.	Total increase of PM ₁₀ 101.58µg/m ³ Total reduction of NO ₂ 1221.62µg/m ³ 980 properties would experience an improvement in air quality 2 properties with no change 56 properties would experience a reduction in air quality.	Moderate beneficial
	Greenhouse Gases	With this scheme in place greenhouse gas emissions in 2022 would be 27% greater than those for the Do Minimum in the Opening Year of 2007. The results also show that with the strategy in 2022 the greenhouse gas emissions would be 15% greater than the do-minimum in 2022.		Negative when compared against both 2007 and 2022 Do Minimums.
	Landscape	Large scale open arable landscape which will generally be able to accommodate the scale of the road, although this will not be the case where the route passes through the hamlet of Stratton St Michael.		Moderate adverse
	Townscape	Long Stratton is an attractive and thriving rural market town that will greatly benefit from the removal of through traffic from the town centre.		Moderate beneficial
	Heritage of Historic Resources	Removal of traffic from the town centre will generally improve the setting of some listed buildings, although the new route will affect the setting of listed buildings in Stratton St Michael. Five sites of known archaeological interest will be directly affected.		Moderate adverse
	Biodiversity	Majority of scheme passes through arable land of low ecological value. However, several ponds would be affected which may contain Great Crested Newts, however detailed mitigation measures have been developed to reduce the level of impact.		Slight adverse
	Water Environment	Assuming construction impacts are mitigated, the overall impact of the proposed improvement would be marginally beneficial due to reduced risk of accidents causing severe pollution events.		Neutral

Option	Description	Problems	Present Value Cost									
A140 Long Stratton Bypass	Approximately 5km length of carriageway of which three quarters will be dualled passing to the east of the village of Long Stratton, with connections to the existing road network via roundabouts at either end of the scheme. Two all purpose over bridges and cycle/pedestrian over bridge.	Congestion in the centre of Long Stratton with associated noise, air quality and safety issues. Status: Primary principal road Current traffic flow: approx. 18000 vehicles/day. Current %age of HGV: approx. 9%.	PVC to public accounts: £19.6m									
OBJECTIVE	SUB-OBJECTIVE	QUALITATIVE IMPACTS	QUANTITATIVE MEASURE	ASSESSMENT								
	Physical Fitness	It is possible that the scheme will cause an increase in physical activity due to the enhancement of the public footpath network.	No data available	Moderate beneficial								
	Journey Ambience	Improved information, reduced frustration and reduced fear of accidents will reduce traveller stress.		Large beneficial								
SAFETY	Accidents		<table border="1"> <thead> <tr> <th>Accidents</th> <th>Fatal</th> <th>Serious</th> <th>Slight</th> </tr> </thead> <tbody> <tr> <td>-153</td> <td>-8</td> <td>-46</td> <td>-215</td> </tr> </tbody> </table>	Accidents	Fatal	Serious	Slight	-153	-8	-46	-215	PVB: 14.4
	Accidents	Fatal	Serious	Slight								
-153	-8	-46	-215									
	Security	Neutral overall impact.		Neutral								
ECONOMY	Public Accounts			PVC: 19.6								
	Business Users & Providers		Users PVB: 33.7 Transport providers PVB: 0.1	PVB: 33.8								
	Consumer Users		Users PVB: 29.6	PVB: 29.6								
	Reliability	More consistent and reliable journey times.	Do minimum stress 83% Do something stress 75%	Neutral								
	Wider Economic Impacts	It is possible that that the bypass may improve HGV route reliability journey times along the A140 corridor and beyond.		Neutral								
ACCESSIBILITY	Option Values	No additional options.		Neutral								
	Severance	Reduced community severance due to the removal of through traffic from the village.		Moderate positive								
	Access to the Transport System	No direct impact.		Neutral								
INTEGRATION	Transport Interchange	No direct impact.		Neutral								
	Land-Use Policy	Consistent with sub regional strategy for the Norwich area.		Neutral								
	Other Government Policies	Improved local air quality and quality of life for residents in Long Stratton. Possible improvements in reliability of bus services due to the removal of congestion problems.		Slight beneficial								

AMCB Table

Analysis of Monetised Costs and Benefits
Units £,000s; 2002 prices with 15% risk allowance

Noise		
Local Air Quality		
Greenhouse Gases		
Journey Ambience		
Accidents	14376	
Consumer Users	29638	
Business Users and Providers	33838	
Reliability		
Option Values		
Present Value of Benefits ^(see notes) (PVB)	77852	
Public Accounts	19562	
Present Value of Costs ^(see notes) (PVC)	19562	
OVERALL IMPACTS		
Net Present Value (NPV)	58290	<i>NPV=PVB -PVC</i>
Benefit to Cost Ratio (BCR)	3.980	<i>BCR=PVB /PVC</i>

Note : This table includes costs and benefits which are regularly or occasionally presented in monetised form in transport appraisals, together with some where monetisation is in prospect. There may also be other significant costs and benefits, some of which cannot be presented in monetised form. Where this is the case, the analysis presented above does NOT provide a good measure of value for money and should not be used as the sole basis for decisions.

Major Scheme Checklist

The following needs to be provided in any submission to the DfT. Any omissions from this list should be agreed with the Department prior to submission.

Scheme Description:

	Section/Page
Clear description of all the scheme options which have been assessed	3.3
Evidence that a number of realistic alternative options have been seriously considered	3.3
A fully worked up credible lower cost alternative:	3.3.5
With a comprehensive AST, TEE tables, and AMCB table	
With scenario and sensitivity testing	
With supporting analyses	
Breakdown of the cost estimate	3.4
Costs in expected values (or include an allowance for risk)	3.6
Cost profile of the anticipated out-turn costs	4.4

NATA Assessment:

	Section/Page
The following Statutory Bodies consulted: (And their responses included)	
English Nature	3.8.2
The Environment Agency	3.8.2
English Heritage	3.8.2
The Countryside Agency	Not consulted at planning application stage
Assessment of Environmental impacts	3.8.2
Assessment of Safety impacts and the assumed accident rates presented	3.8.3
Assessment of Economic impacts	3.8.4
Assessment of Accessibility impacts	3.8.5
Assessment of Integration impacts	3.8.6
A comprehensive Appraisal Summary Table	3.8.7
The following supporting analyses:	
Distribution and Equity	3.11.1
Affordability and Financial Sustainability	3.11.2
Practicality and Public Acceptability (Evidence of public consultation supplied)	3.11.3
Contribution to 10 year plan targets	3.11.4
GOMMMS worksheets	Appendix D

Risk:

	Section/Page
A Risk Register	3.6.1
A full risk assessment	3.6.1

Cost Benefit Analysis:

	Section/Page
A clear explanation of the underlying assumptions used in the Cost Benefit Analysis	Appendix G
A full description of the do-minimum	Appendix G
Information on local factors used. For example the derivation of growth factors, M factors in COBA and annualisation factors in TUBA	Appendix G
A diagram of forecast traffic flows for the do-minimum and scheme options, for affected corridors	Appendix G
A diagram of network (COBA) or zone plan (TUBA)	Appendix G
Information on the number of junctions modelled if COBA used for both the do-minimum and do-something	Appendix H
Information on the split of the travel time benefits between junctions and links	Appendix H
Information on the level of journey time saving by modelled period (flow group in COBA)	Appendix H
Details of maintenance delay costs/savings	Appendix G
Details of delays during construction	Appendix G
If the model includes very slow speeds or high junction delays evidence of their plausibility	N/A
An explanation of any high forecasts of flows above road capacity, especially for the do-minimum, and how these are accounted for in appraisal	N/A
An assessment of induced traffic, as per DMRB 12.2.2. If a variable matrix has not been used, full justification will be needed	Appendix G
A spreadsheet showing how the TEE table was derived and/or TUBA/COBA inputs/outputs	Appendix H

Modelling:

	Section/Page
A local model validation report including:	Appendix G
An existing data and traffic surveys report	
A diagram of the traffic model network and zone plan	
Network validation information including range checks, link lengths, route checking, and journey times for critical movements	
Trip matrix validation	
Present year validation if the model is more than 5 years old	
A diagram of existing traffic flows, both in the immediate corridor and other relevant corridors	

Scenarios/Sensitivity Testing:

	Section/Page
Optimistic and Pessimistic scenarios	3.10
Appropriate sensitivity testing (as outlined in the Appraisal Guidance)	3.10

Monitoring and Evaluation:

	Section/Page
Plans for Monitoring and Evaluation have been outlined / considered	4.7

1.0 Introduction

This Major Scheme Business Case is a bid to the Department for Transport (DfT) for funding to construct a bypass of the village of Long Stratton in South Norfolk as identified within the Norfolk County Council Structure Plan Policy T9. A plan showing the surrounding Highway network is shown in Figure 3.1 and a schematic layout of the proposed bypass is included as Figure 3.2. The key scheme objective is to remove/reduce through traffic from the built-up area of Long Stratton.

The A140 between Ipswich and Norwich provides an important link between Norfolk and London via the A12 and M25 and the Midlands via the A14. The village of Long Stratton is located on the A140 approximately 15 km south of Norwich.

The A140 between the A47 and A14 is generally single 7.3 metre carriageway, with a dual 2 lane all-purpose carriageway at Scole. There is currently no long-term strategy to undertake major route improvements to the A140 in Norfolk or Suffolk other than a bypass for Long Stratton.

The County Council became responsible for the A140 in Norfolk during 2001 when this road was de-trunked by central Government. In anticipation of this the County Council carried out some preliminary work looking at possible routes for a bypass of Long Stratton in 2000. The primary purpose of this exercise was to aid the consideration of programme priorities in the medium term as part of the County Council's Local Transport submissions to central Government. This work identified the corridors only and road alignments within these broad corridors were not identified.

A Stage 2 assessment was undertaken on five route alternatives, which were considered at both single and dual carriageway standards. These alternatives represented schemes within the broad corridors examined in 2000. The Stage 2 assessment was used to identify, and provide sufficient information on, the factors to be taken into account in choosing between the alternative schemes. This information was presented at Public Consultation in 2002 and subsequently to the Cabinet of Norfolk County Council to assist in making a decision on whether to pursue a bypass for Long Stratton and, if so, which alternative to adopt.

After considering a report on the Public Consultation in January 2003 Cabinet resolved to undertake further assessment work on a number of variations to one of the eastern routes. Following further consultation with stakeholders and two further reports, the Cabinet of Norfolk County Council resolved to adopt a preferred standard and alignment for the bypass.

The preferred scheme has been developed through Stage 3 Assessment and was submitted for Planning Application in September 2004. The application was considered by the County Council's Planning and Regulatory Committee in February 2005 and approved. As the scheme is not in the local Development Plan, the application was referred on to the Secretary of State. He has concluded that the matters arising can be satisfactorily addressed by the Council and that the issues are not of such significance to warrant calling in of the application and examination at public inquiry.

The scheme was included within the Local Transport Plan (LTP) Annual Progress Reports submitted in both 2003 and 2004, and is included as a major scheme in the LTP 2006-2011.

This business case sets out the proposed scheme and its objectives. The Appraisal Summary Table (AST) and associated worksheets are presented, together with other relevant information.

2.0 Strategic

2.1 Assessment against Local Objectives

2.1.1 Draft East of England Plan

The draft East of England Plan has identified significant growth in housing and jobs in Norfolk between 2001 and 2021. The spatial strategy in the draft East of England Plan aims to achieve a sustainable relationship between jobs, homes and services at the strategic and local level. The spatial, economic and transport considerations need to be planned together because they are all strongly inter-related: housing growth will lead to more people in Norfolk, and they will need jobs and access to those jobs. Transport will need to play an integral part in providing the right conditions to enable the growth to happen, and in actually delivering the growth. This necessary integration is recognised in the draft East of England Plan, which includes the draft Regional Transport Strategy. The draft East of England Plan states that development will be focused in or adjacent to major urban areas where there is good public transport accessibility and where strategic networks (rail, road and bus) connect.

Norwich Sub-Region

It identifies Norwich as a key centre in which development and change will be focussed, particularly housing and jobs growth. There will be considerable housing growth in the area, with the Norwich urban area set to have the largest amount of growth of any town or city in the whole of the East of England. This is likely to include a significant mixed-use urban extension on the north-east fringe of Norwich. There could be significant expansion at Norwich International Airport, the Norwich Research Park (including research institutions, the University of East Anglia and the Norfolk and Norwich University Hospital) and Business Parks close to the A47. Elsewhere in the Sub-Region, housing and economic growth will be focussed on the market towns, particularly on the A11 corridor. The draft East of England Plan recognises that locations for growth are likely to need significant infrastructure investment.

The emerging Norwich Sub-Region in the draft East of England Plan contains Norwich and extends to the surrounding ring of market towns broadly within a 30 minutes drive time. The objectives of the sub-regional strategy in the East of England plan include to:

- Facilitate the role of the area as the major focus for sustainable growth in the north east of the region;
- Secure the infrastructure required to assist in the sustainable growth and regeneration of the sub-region;
- Sustain and develop the regional role of Norwich, ensuring it realises its full growth potential as well as maximising the benefits of its role as the most significant city centre in the East of England;
- Provide a coherent basis for a sustainable transport strategy to benefit access by all modes of transport;
- Promote the development of Norwich Airport as a regional airport and international gateway with better surface transport links to the rest of the Region.

2.1.2 Local Transport Plan 2006/07 to 2010/11

The overall strategy for Norfolk's second Local Transport Plan is to reduce the need to travel and help people and businesses get where they need to get to, and enable them to do this in a more sustainable way, whilst reducing congestion, protecting and enhancing the environment, and improving road safety. This is being planned through five thematic strategies that represent our strategic aims:

- Delivering sustainable growth
- Improving accessibility
- Reducing congestion
- Protecting and enhancing the environment
- Improving road safety.

These provide the policy framework for more specific area strategies. For the second Local Transport Plan, these have been made sub-regional strategies to be consistent with the draft East of England Plan. One of these is the Norwich Sub-Regional Transport Strategy.

Norwich Sub-Regional Transport Strategy

A revised transportation strategy for the Norwich built-up area was agreed in October 2004: the Norwich Area Transportation Strategy (NATS). The strategy for the Sub-Region carries forward the main elements of NATS and sets these in the context of the sub-region.

The transport strategy has been designed to help the aim of the Norwich Sub Region Strategy in the draft East of England Plan to contribute to a more successful, outward looking and regenerated sub-region with a higher quality of life. The strategy:

- Recognises the Norwich area as a centre where growth will be focussed, recognising the importance of providing essential infrastructure needed to accommodate growth. The Norwich Sub-region will need to accommodate around 45,000 new homes between 2001 and 2021, with around 27,000 of these being in or around the city of Norwich itself;
- Supports the development of the Norwich area as a sustainable community, complementing development by measures to provide a high quality urban experience;
- Supports the role of market towns as a focus for their surrounding rural area and Norwich's role as a Regional Interchange Centre;
- Promotes travel choice and accessibility into and within the Sub-Region by all modes.

Good access to Norwich from within the sub-region will be necessary to ensure the sub-region functions efficiently, is well-connected, and that the synergies and mutual dependencies between Norwich and the market towns are realised. Studies have demonstrated the powerful catalytic effect of investment in high quality connections on the economy. Good access by public transport will be essential and improvements to

key routes for buses from the market towns to Norwich will be given countywide priority. This will capitalise on the public transport major scheme implemented as part of the first Local Transport Plan and will complement the six Park and ride sites around Norwich. This will help us to continue to reduce the amount of traffic entering Norwich (between 1995 and 2004 this fell by 19%). This will also help Norwich to develop further as a Regional Interchange Centre.

In addition, accessibility for other traffic such as cars and freight vehicles is an integral part of the strategy, especially as these will continue to constitute the majority of movements within the sub-region. The transport strategy for the sub-region recognises the need for high quality routes and reliable journeys for all vehicles on the main radial routes in the sub-region to promote easy access to Norwich from the market towns. Targeted improvements to the road infrastructure will therefore be required, especially where persistent congestion is apparent and where this and the high traffic flows impact particularly negatively on the larger rural communities in the sub-region.

The A140 is identified in the draft East of England Plan as part of the regional road network connecting the Regional Interchange Centres at Ipswich and Norwich. Table 8.3 in the draft East of England Plan identifies the A140 for improvements. Agreement between Norfolk and Suffolk County Councils has been reached on the approach to the A140 between Norwich and the A14 in Suffolk. In the foreseeable future, most of the improvements on the A140 are likely to be modest with a focus on addressing specific issues such as road traffic accidents and community severance. Within Suffolk the approach to speed management is currently under review by the County Council. However, within the Norwich Sub-Region, improvements to the principal roads will play a significant role in enhancing connectivity and supporting a balanced approach to development in this area. The traffic congestion at Long Stratton on the A140 is one of two major bottlenecks having a negative impact on connections between the ring of market towns and Norwich; in this case between Diss (which is highly likely to accommodate a significant proportion of South Norfolk Council's growth) and Norwich.

The A140 improvement at Long Stratton will help us to meet all five of our Local Transport Plan strategic aims:

- Deliver sustainable growth
- Improve accessibility
- Reduce congestion
- Protect and enhance the environment
- Improve road safety.

2.1.3 Norfolk Structure Plan: Adopted 1999

The structure plan provides a strategic policy framework for local planning and development control consistent with national and regional policy. Additionally it ensures consistency between adjacent local plans. The relevant policies are scheduled below:

Policy	Policy Summary	Scheme Effects
Structure Plan – Norfolk County Council		
CS.1	Providing for sustainable development	Rating: Neutral
CS.5	Local strategies for communities – including Long Stratton	Rating: Beneficial
CS.7	Conserving landscape character and wildlife and protecting agricultural, recreational and natural resources.	Rating: Adverse
ENV.1	Protecting environmental assets and enhancing biodiversity	Rating: Beneficial
ENV.4	Protecting the character of the landscape	Rating: Adverse
ENV.8	Protecting of designated and proposed sites of regional and local importance for nature and geological interest	Rating: Neutral
ENV.9	Protection of areas of wildlife quality	Rating: Neutral
ENV.13	Maintaining and improving historic urban and built environment	Rating: Beneficial
T.1	Integrated approach to transport planning	Rating: Beneficial
T.9	Specific road improvement schemes including a bypass for Long Stratton	Rating: Beneficial
T.10	Through traffic encouraged to use strategic route.	Rating: Beneficial
T.12	Criteria for improvements to County Roads network	Rating: Beneficial
RC.1	Protecting deterioration of surface waters	Rating: Beneficial
RC.3	Mitigation of flooding	Rating: Neutral
RC.5	Use of agricultural land	Rating: Adverse

Table 2.1: Structure Plan Policies

2.1.4 South Norfolk Local Plan :Adopted March 2003

The relevant Local Plan policies are scheduled below.

Policy	Policy Summary	Scheme Effects
Local Plan – South Norfolk Council		
ENV3	Protection of river valleys and this will include the Tas valley north of B1527	Rating: Neutral
ENV8	Sensitive integration of development in the open countryside	Rating: Beneficial
ENV9	Impact on the setting of archaeological remains	Rating: Adverse
ENV20	Development on village greens and commons not permitted	The scheme does not affect village greens or commons either directly or indirectly Rating: Neutral
ENV21	Protection of agricultural land	The scheme passes across arable farmland but by its nature cannot be accommodated within existing development limits of the village or land of poorer quality Rating: Adverse
ENV19	The protection of trees through tree preservation orders	One tree near the works is subject to a TRO and it will be protected and retained. Rating: Neutral
ENV12	Protection of SSSIs	There are no direct or indirect impacts Rating: Neutral
ENV13	Protection of sites of regional and local conservation interest and geological/geomorphological value	No sites are affected by the works Rating: Neutral
ENV14	Habitat protection	The impact on existing habitat is limited and will be significantly added to by the proposed scheme Rating: Beneficial
ENV15	Species protection	Great Crested Newts are present in the area The scheme will include a full package of mitigation measures Rating: Neutral
ENV17	Maintenance of access to sites of nature conservation value	No accesses are affected Rating: Neutral
IMP25	The reduction of outdoor lighting impacts	The lighting scheme will be the minimum required for highway safety purposes Rating: Neutral
IMP1	Design standards ie bridges etc	Two road bridges and one footbridge over the bypass are proposed and there design will be fit for purpose. Rating: Beneficial
IMP2	Landscape requirements	The proposals will incorporate substantial landscaping Rating: Beneficial

Policy	Policy Summary	Scheme Effects
Local Plan – South Norfolk Council		
IMP15	Impact of proposals on listed buildings	The scheme adversely affects the setting of Stratton St Michael but significantly benefits the setting of listed buildings through Long Stratton Rating: Beneficial
IMP18	Development in conservation areas	The scheme will contribute to an improved environment in the centre of Long Stratton Rating: Beneficial
IMP10	Noise impact protection	The scheme will cause an increase in noise levels to some properties along its length. The number of properties receiving relief to noise is substantially more. Rating: Beneficial
SHO4	Encouragement of retailing and services development within defined central business areas	The scheme may contribute by providing an improved environment in the centre of Long Stratton Rating: Beneficial
TRA1	Provision of pedestrian links	The scheme maintains and adds to footpath links which are severed. A reduction in traffic through the centre of Long Stratton would allow enhancements to the street scene including improvements to footways. Rating: Beneficial
TRA9	Support for improvements including a Long Stratton Bypass	The scheme directly relates to the achievement of this policy Rating: Beneficial
TRA12	The minimising of road schemes landscape and nature conservation impacts	Environmental impacts are fully considered and the proposals contain a substantial package of landscape and conservation measures. Rating: Beneficial
UTL3	Impacts on ground and surface water	Groundwater protection measures have been agreed with Environment Agency. Rating: Neutral
UTL4 and UTL5	Surface water drainage	A flood risk assessment has been prepared and agreed with the Environment Agency Rating: Neutral

Table 2.2: Local Plan Policies

3.0 Appraisal and Value for Money

3.1 Scheme Description

3.1.1 Existing Situation

The existing highway network in the area, shown on Figure 3.1, comprises the A140 running southward from the A47(T). The B1527 meets the A140 to the north of Long Stratton.

The A140 carries some 18000 vehicles per day through Long Stratton with approximately 9% heavy goods vehicles. The road through the village reduces down to 5.7 metres wide with narrow 1.2 metre wide footways in places.

A 30 mph speed restriction on the A140 through the centre of the village exists between Lime Tree Avenue and St. Michael's Road. 50mph zones extend either side of the 30mph restriction for approximately 700m to the north and 900m to the south. Gateway signing, 'Dragon Teeth' markings and carriageway roundel markings have been introduced to reinforce the speed restrictions on the approach to the built-up area.

Within the built-up area there are nine road junctions one of these is signal controlled, and one signal controlled pedestrian crossing. Most of the junctions do not meet current standards for layout and visibility. In the area of Stratton St. Michael there are two road junctions which also do not meet current standards.

The horizontal and vertical alignment within Long Stratton is not compatible with current design standards for this type of road. Any attempt to improve the standard would require significant demolition and land-take from properties fronting the A140.

The current speed restrictions, signal-controlled junction and pedestrian crossing act to slow down through traffic within the built up area, creating a pinch point on the route. Some typical photographs of the existing condition are shown in Figures 3.3, 3.4 and 3.5.

3.1.2 Description – A140 Long Stratton Bypass

Overview

The proposed scheme is shown on the plans included in Appendix A. At the southern end of the scheme for the first 0.5km the new road would be a single carriageway 7.3m wide with verges to either side a minimum of 2.5m wide. The road would then be upgraded to dual carriageway for the remaining 4.3km of its length. The dual carriageway would comprise two 7.3m wide carriageways, 1.0m wide hard strips with verges to either side a minimum of 2.5m wide. A central reserve a minimum of 2.5m wide would separate the two carriageways. New roundabout junctions would be provided at both ends of the dual carriageway section of the bypass.

The road layout and geometry have been designed in accordance with the principles of the standards set down in the Design Manual for Roads and Bridges (DMRB). The alignment follows the requirements of DMRB Vol. 6.1.1 'Highway Link Design' adopting a design speed of 120kph for the dual carriageway section of the bypass and 100kph

for the single carriageway section. The design of the two roundabouts complies with the requirements of DMRB Vol. 6.2.3 'Geometric Design of Roundabouts'.

Detailed Route Description

This route leaves the A140 just north of Limetree Farm. A new 7.3m wide single carriageway would swing north east through open arable farmland to a new roundabout junction north east of Wild Rose Farm. A new 7.3m wide carriageway on a 180m radius would link the roundabout back to the existing A140 and to the village of Long Stratton. Verge widening on the inside of the bend would provide the required forward visibility on the approach to the roundabout. The new roundabout would be lit using full cut off lanterns with a high pressure sodium light source on 8/10 metre high lamp columns. The lighting would extend for a distance of 60m on each arm of the roundabout.

From the roundabout the dual carriageway curves on a 1020m radius in a north easterly direction crossing open arable farmland before cutting through Parker's Lane in a 1.8m deep cutting. Safety barriers would be provided in the central reserve along the entire length of dual carriageway. The central reserve would be widened to provide the required forward visibility in front of the safety barrier for southbound bypass traffic on the approach to the roundabout.

Parker's Lane would be stopped up to prevent vehicular access onto or across the bypass. Turning heads would be formed either side of the new road and a right of way would be formed to enable pedestrians to cross the new road using an at grade crossing.

The new road then passes in a 4.5m deep cutting under a realigned Hall Lane. The realigned Hall Lane would comprise a new 6.0m wide carriageway with a 1.8m wide footway for some of its length. A new overbridge would be formed to carry Hall Lane over the bypass. No vehicular or pedestrian access would be possible from Hall Lane onto the bypass.

New rights of way for pedestrians would be provided to maintain links with existing footpaths in the Parker's Lane area and a new bridleway would be formed along the western side of the new road to link Parker's Lane with Hall Lane.

From Hall Lane the route continues northwards across a mixture of open arable farmland and grazing pasture before crossing Edge's Lane in a 1.5m deep cutting. Edge's Lane would be stopped up to prevent vehicular access onto or across the bypass. Turning heads would be formed either side of the new road and a new overbridge would be formed to maintain a right of way for pedestrians and cyclists across the new road. New rights of way for pedestrians would be provided to maintain links with existing footpaths either side of the new road between Hall Lane and Edge's Lane.

The new road continues northwards crossing a realigned Church Lane close to Thatched Cottage in a 3.3m deep cutting. The landscape changes at Church Lane to undulating arable farmland with some intermittent woodland. The alignment of the new road crosses an overgrown orchard within the eastern curtilage of the property known as The Cedars before emerging from cutting to rejoining the A140 on an embankment a

maximum of 2.5m high at a new roundabout formed at the B1527/C497 (Hempnall crossroads) junction.

On the western side of the bypass earth mounding would form a false cutting to provide a 4.5m high screen between the bypass and Churchfields housing estate. The false cutting would extend from the housing estate in a northern direction to screen from the new road existing ribbon development that currently adjoin the A140. A similar combination of cutting and earth mounding would be provided on the eastern side of the new road to screen the small settlement of Stratton St. Michael which includes the Church of St Michael. Typical cross sections through the scheme are shown on the plan included as Appendix B.

New rights of way for pedestrians would be provided to maintain links with existing footpaths either side of the new road between Edge's Lane and Church Lane.

The realigned Church Lane would comprise a new 5.5 - 6.0m wide carriageway with a 1.8m wide footway for some of its length. A new overbridge would be formed to carry Church Lane over the bypass. No vehicular or pedestrian access would be possible from Church Lane onto the bypass.

The new roundabout at the A140/B1527/C497 junction would be lit to the same standard as the road lighting proposed at the southern roundabout. The proposed lighting would replace the existing lighting at the junction and tie in with the current lighting along the A140 to the north.

The existing A140, B1527 and C497 would be realigned to form new junctions with the roundabout. The realigned link to Long Stratton would be on a 180 metre radius which would require verge widening on the inside of the bend to provide the required forward visibility on the approach to the roundabout.

A segregated cycle route would be provided around the outside of the A140/B1527/C497 roundabout with links to all arms except the dual carriageway bypass. Cyclists using the A140 would be encouraged to use the old A140 through the village.

The proposed scheme includes two lay-bys on the dual carriageway section of the bypass. The layout of the lay-bys are designed in accordance with DMRB TA 69/96 Vol. 6.3.3 'The Location and Layout of Lay-bys'.

The scheme requires the excavation of approximately 348,000 cubic metres of soil, and it is anticipated that approximately 167,000 cubic metres of surplus soil would be generated mainly as a result of the road being placed in a cutting to screen the new road from properties in the surrounding landscape. This surplus soil would be reused off-site or disposed of at landfill.

On the A140 north of the roundabout at the Church Lane junction in Tasburgh, minor improvement within the limits of the highway would be undertaken as part of the proposed scheme to provide width for two lanes of cars to turn out from Church Lane.

Traffic Effects of the Proposed Scheme

The total bypassable annual average daily traffic (AADT) in Long Stratton, in 2007, is 6488 – 7147 vehicles northbound and 6240 – 6596 vehicles southbound. Residual traffic flows through the centre of the village in 2007 would be in the range 5633 – 6260 vehicles. Further details of the traffic model are provided in Appendix G.

Much of the current delays and congestion on the minor roads within the village is directly or indirectly due to traffic levels on the A140.

Although an origin and destination survey was not carried out, the changes in surveyed traffic flows on the western side of the village reveal a pattern of movements. Flows on Swan Lane immediately adjacent to the A140 The Street are lower in both directions than between St Michael's Road and Manor Road. This may reflect the poor standard of the A140/Swan Lane junction. Some drivers seek to avoid turning right into Swan Lane or queuing to enter the A140. Manor Road southbound flows were also around a third more than the northbound flows. It is considered that drivers are using this route, as it is easier to turn right at the signalled A140/Flowerpot Lane junction.

Where this traffic congestion is relieved, some minor redistribution of flows on Manor Road, Swan Lane and Flowerpot Lane may be expected. Suppressed short trips may also be generated within the village such as increased car journeys to the local shops because of the removal of the delay in reaching the destination. The removal of through traffic from the centre of Long Stratton will provide opportunities to improve walking and cycling within the centre of the village.

It is not anticipated that the proposed scheme would have any significant effects on traffic patterns within the village of Long Stratton other than the reduction of through traffic on the existing A140.

The reduction of traffic flow through the village may increase vehicles speeds especially during the peak periods where traffic speeds are currently held down due to traffic congestion. To encourage drivers to adopt a uniform speed through the village and influence driver behaviour towards non-motorised road users, non-vertical deflection traffic calming measures would be introduced along the bypassed section of the A140 through the village. Measures would be developed in consultation with local stakeholders to be implemented immediately following the opening of the bypass.

Outside the village of Long Stratton construction of the proposed roundabout at the northern end of the bypass may make the B1527/C497 junction more attractive :

- During the traffic surveys a larger A140 Norwich Road southbound to B1527 Bungay Road eastbound turning movement was noted in the PM peak than the reverse AM peak flow. Only a number of small villages feed the B-road and this is reflected in that even the PM peak hourly turn is less than 100 vehicles;
- The old B1135 Fundenhall Road was downgraded to the C497 because of its poor alignment and subsequent high accident level. By facilitating improvement at the C497/A140 junction with a roundabout, it is possible that the flows may rise not only on the C497, but also between Wymondham and

the B1113, via Ashwellthorpe (C594 Wymondham Road) and, to a lesser degree, via Wreningham/Hethel area (C186 Wymondham Road). The increase in traffic flows on these roads is not expected to be significant and is impossible to quantify until the scheme has been open to traffic for some time to allow traffic patterns to settle down;

- Flordon and Lower Tasburgh generated traffic may be attracted to use Low Road and the C497 to access the A140 due to delays currently experienced at peak times by drivers wishing to turn right from Church Lane onto the A140, as the junction currently only allows for a single line of queuing traffic. Low Road is subject to a 30mph speed limit, and is unsuitable for any additional traffic. Prior to the opening of the bypass it is difficult, because of the small numbers involved, to quantify the potential increase in traffic using this route. It is, however, proposed to carry out minor improvement to the Church Lane/A140 junction as part of the proposed scheme to provide width for two lanes of cars to turn out and reduce waiting times. This would relieve pressure on Low Road.

Figure G.3 contained within Appendix G shows the highway network to the north of the B1527 junction.

It would be difficult to assess in advance small changes in traffic volumes on the C497 and Low Road consequent to the opening of the bypass. A traffic impact study would be undertaken to compare 'before' and 'after' traffic flows on the C497, B1113, C594 and Low Road. This study would be undertaken approximately 6 months after the bypass has opened to traffic and would enable a full assessment of any significant effects to be undertaken.

A review of the County's Route Hierarchy would also be undertaken to assess the need for any changes as a result of the proposed scheme.

Landscape Mitigation

Detailed landscaping proposals for the scheme have been developed in conjunction with landscape architects and environmentalists, in order to help minimise impact on the natural and built environment. In particular measures have been developed to satisfy English Nature requirements to mitigate impacts on small meta populations of the Great Crested Newt, either directly affected or indirectly affected by the severance effects of the new road. These include six new ponds and associated terrestrial habitat.

Other measures include raised landscaping areas to screen Stratton St Michael and its church, a Grade 1 Listed Building. A raised landscape area is proposed to help protect housing to the west of the bypass and on the eastern fringe of Long Stratton, including the Churchfields housing estate.

A schematic landscape plan for the proposal is shown in Figure 3.6.

Consultation

A public consultation was held in autumn 2002 . This comprised the distribution of a consultation leaflet and questionnaire to the surrounding local population, key

stakeholders and statutory bodies. A copy of the consultation leaflet is contained in Appendix K. Key stakeholders and statutory bodies were also sent copies of the Stage 2 Assessment report. Further a series of staffed exhibitions were held at a local venue together with an open public meeting.

After considering a report on the Public Consultation in January 2003 the Cabinet of Norfolk County Council resolved to undertake further assessment work on a number of variations to one of the eastern routes. Following further consultation with stakeholders and two further reports, the Cabinet resolved to adopt a preferred standard and alignment for the bypass.

The preferred scheme was taken forward for more detailed engineering development and Stage 3 Environmental Assessment and further consultation with local stakeholders and statutory bodies.

A preferred layout was presented to Cabinet in January 2004, with a scheme submitted for planning application in September 2004. The application was supported by an Environmental Statement, and was subject to formal consultation under the planning processes. The application was reported to Planning Regulatory Committee of Norfolk County Council on 18 February 2005 and approved unanimously. As the scheme is not in the local Development Plan, the application was referred on to the Secretary of State, He has concluded that the matters arising can be satisfactorily addressed by the Council and that the issues are not of such significance to warrant calling in of the application and examination at public inquiry.

3.1.3 Enhancements to Village

Traffic calming measures would be introduced along the bypassed section of the A140 through the village as an integral part of the proposed scheme. Measures would be developed in consultation with local stakeholders to be implemented immediately following the opening of the bypass. Features are likely to include footway widening, carriageway narrowing, and enhanced provision for cyclists. As a reduction in traffic flow may lead to an increase in vehicle speeds measures will need to be introduced to encourage drivers to adopt appropriate uniform speed through the village and influence driver behaviour towards non motorised more vulnerable road users.

3.2 Problems and Objectives

3.2.1 Project Objectives

There are several problems where the A140 passes through Long Stratton:

- Narrow sections of carriageway and footways;
- Some junctions with side roads which don't meet the latest standards;
- Speed restrictions and traffic signals which create tailbacks and delays on the A140 at times;
- Traffic congestion, noise, pollution and safety issues.

The main objectives of the project are:

Economy

- To improve strategic road links and bypass the village of Long Stratton;
- Promote more reliable journey times especially for commercial traffic;

Integration

- To support the vitality and enhance the settlement of Long Stratton;

Environment

- To reduce traffic congestion through the village of Long Stratton;
- To improve local air quality and noise pollution;
- Deliver a scheme that enhances the built environment;
- Deliver an environmentally acceptable scheme that protects and enhances the natural environment;

Safety

- To improve safety for all road users;

Accessibility

- To improve access to local facilities.

3.2.2 Local and Regional Objectives

The proposal is consistent with the aims and objectives of the Local Transport Plan as set out in Table 3.1

Project Objectives	Relevant local problems and LTP Objective
Improve Strategic Road Links	Remoteness of Norfolk and resulting poor economic performance. LTP objective – Improve strategic accessibility to Norfolk
Promote more reliable journey times especially for commercial vehicles and public transport	Unreliable journeys due to unpredictable delays. LTP objective – Improve journey reliability, including for public transport.
To support the vitality and enhance the settlement of Long Stratton	LTP objective – Provide less threatening environment for travel, especially non-motorised travel.
Reduce traffic congestion through Long Stratton	Poor road infrastructure. Congestion. LTP objective – reduce the number and severity of congestion incidents, particularly where it affects public transport.
Improve local air quality and noise pollution	Gradual degradation and loss of tranquillity. LTP objective – Minimise adverse impacts of transport provision on the built and natural environment. LTP objective – Improve local air quality.
Enhance the built environment	Impact of traffic on urban areas. LTP objective – Minimise adverse impacts of transport provision on the built and natural environment.
Deliver a scheme that protects and enhances the natural environment	Gradual degradation and loss of landscape, tranquillity and countryside. LTP objective – Minimise adverse impacts of transport provision on the built and natural environment.
Improve safety for all road users	Accidents, especially KSI's on main roads. LTP objective – Reduce the number and severity of road traffic accidents. LTP objective – Provide a less threatening environment for travel especially non- motorised travel.
Improve access to local facilities	Perceived and actual danger from traffic on pedestrians and cyclists. LTP objective – Improve access to key services, facilities and opportunities.

Table 3.1: Project Objectives

3.2.3 Accidents

The A140/B1527 junction is identified as an accident cluster site (5 or more personal injury accidents occurring within a 30 metre radius during a 3 year period). There was no pattern to the accidents but the trend level has remained constant over a number of years. The junction is perceived locally to be dangerous and it would be reasonable to assume that some local drivers find alternative routes which avoid this junction.

Over the five year period between 1st January 1999 and 31st December 2003 there has been 48 recorded personal injury accidents along the A140 within the limits of the scheme.

Figure 3.7 and 3.8 illustrate the locations and severity of all the injury accidents recorded. Tables 3.2, 3.3 and 3.4 contain an analysis of this data and a comparison of the actual number of personal injury accidents per 100 million vehicle kilometres against the national averages for built up and non-built up areas.

The tables indicate that the A140 south of Long Stratton is the only length of the A140 within the study area to exceed the national average values.

Category	Length	Number of Personal Injury Accidents						Calculated Number of Injury Accidents per 100 million vehicle kilometres (Based on 2001 AADT)	National Averaged Number of Injury Accidents per 100 million vehicle kilometres (2001)
		99	00	01	02	03	Total		
	Km	99	00	01	02	03	Total		
Fatal		0	0	0	0	0	0		
Serious		0	0	3	0	0	3		
Slight		0	2	2	2	2	8		
Total	1.38	0	2	5	2	2	11	28	26

Table 3.2: Accident Rates for Non built up A Class Roads (South of Long Stratton)

Category	Length	Number of Personal Injury Accidents						Calculated Number of Injury Accidents per 100 million vehicle kilometres (Based on (2001 AADT))	National Averaged Number of Injury Accidents per 100 million vehicle kilometres (2001)
		99	00	01	02	03	Total		
	Km								
Fatal		0	0	0	0	0	0		
Serious		2	0	1	1	0	4		
Slight		1	1	5	2	1	10		
Total	1.60	3	1	6	3	1	14	24	26

Table 3.3: Accident Rates for Non built up A Class Roads (North of Long Stratton)

Category	Length	Number of Personal Injury Accidents						Calculated Number of Injury Accidents per 100 million vehicle kilometres (Based on 2001 AADT)	National Averaged Number of Injury Accidents per 100 million vehicle kilometres (2001)
		99	00	01	02	03	Total		
	Km								
Fatal		0	0	0	0	0	0		
Serious		0	0	1	0	0	1		
Slight		3	5	5	4	5	22		
Total	1.70	3	5	6	4	5	23	43	93

Table 3.4: Built up A Class Roads (Within 30mph Zone)

3.2.4 Socio-Economic Characteristics

South Norfolk is largely rural in nature with extensive arable farming. The village of Long Stratton comprises predominately good quality low rise residential development. The village benefits from a range of local facilities including shops, garage, library, healthcare, leisure centre and schools. South Norfolk Council main offices are also here. There is a light industrial estate on the west side of the village. The proposed bypass passes to the east of the village through mainly arable land.

3.2.5 Central Government Objectives

The assessment process requires that the scheme should be compared against the categories of road schemes set out in the Trunk Roads Review, A New Deal for Trunk Roads in England (DETR 1998).

Trunk Road investment falls into 3 main categories:

- safer and healthier communities;
- regeneration and integration;
- supporting jobs and prosperity.

The Long Stratton Bypass is clearly characterised as a conventional rural bypass to provide traffic relief to the bypassed community. Its purpose places it in the first category.

The scheme may also provide an improvement in route reliability particularly for HGVs and in this respect will contribute to the prosperity of the wider community.

In regard to other issues raised in the White Paper it can be noted that the proposed scheme does not damage any environmental sensitive sites. There are localised issues relating to small meta populations of great crest newt, which is addressed by an agreed package of mitigation measures.

Noise issues have been raised as an issue throughout scheme development, and attention has been given to noise mitigation, particularly in respect of the vertical profiling of the road alignment, and the use of raised landscape areas. The road will be surfaced with a noise reducing thin wearing course system.

3.2.6 Problem Mitigation

The degree to which the scheme overcomes identified problems and meets the objectives is considered in Table 3.5. Although the scheme has some adverse impacts, it is considered to provide a better balance between beneficial and adverse impacts than alternative options.

Problem	How Scheme mitigates problem	Effects of alternatives	Extent of mitigation
Objective 1- Improve Strategic Road Links	Targeted improvement to address specific problems on the A140 at Long Stratton	Lower cost WS2 would also mitigate problem	Fully mitigated
Objective 2- Promote more reliable journey times especially for commercial vehicles	A140 traffic will bypass village centre and associated delays	Lower cost WS2 would also mitigate problem	Fully mitigated
Objective 3- To support the vitality and enhance the settlement of Long Stratton	A140 traffic removed from village centre Improved environment for travel within the village especially for non-motorised travel	Lower cost WS2 would also mitigate problem	Fully mitigated
Objective 4- Reduce traffic congestion through Long Stratton	A140 traffic removed from village centre	Lower cost WS2 would also mitigate problem	Fully mitigated
Objective 5- Improve local air quality and noise pollution	A140 traffic removed from village centre	Lower cost WS2 would also mitigate problem but would have an adverse effect on slightly less properties than the proposed scheme	Although there will be significant benefits along the existing A140 through the village a few properties will experience a decrease in air quality and an increase in noise pollution
Objective 6- Enhance the built environment	A140 traffic removed from village centre	Lower cost WS2 would also mitigate problem	Although there will be significant benefits to listed buildings and the conservation area along the A140 there will be a major negative effect on the cluster of properties known as Stratton St. Michael.
Objective 7- Deliver a scheme that protects and enhances the natural environment	Mitigation measures should enhance the wider biodiversity of the area	Mitigation measures should enhance the wider biodiversity of the area	Fully mitigated
Objective 8- Improve safety for all road users	Modern dual carriageway bypass will reduce accidents on A140 Removal of A140 traffic from village centre will provide safer and less threatening environment	Lower cost WS2 would not be as safe as proposed scheme	Fully mitigated
Objective 9- Improved access to local facilities	Perceived and actual danger from traffic on pedestrians and cyclists removed	Lower cost WS2 would also mitigate problem	Fully mitigated

Table 3.5: Problem Mitigation

3.3 Assessment of Alternative Options

3.3.1 Do-nothing Option

The existing A140 route through Long Stratton is substandard in both width and alignment. Some sections of footway and carriageway are too narrow and some junctions do not conform to current design standards. Existing speed restrictions and traffic signals give rise to slow moving traffic and long traffic queues through the village. In addition to this there is much frontage development and many accesses that give rise to a high number of vehicle movements onto the road. Some 18,000 vehicles per day use this road of which 9% are heavy goods vehicles. This level of traffic has a detrimental impact on the environment and the traffic levels are likely to increase over time. With regard to the agreed "shared priorities" to be used as part of the next Local Transport Plan this environmental impact can be expressed as; traffic congestion, poor local air quality, road safety and quality of life in general for the residents of the village of Long Stratton.

The A140 primary principal road is also designated as a strategic route in the Norfolk County Council route hierarchy. This means that it is a key route providing access to Norwich from the towns and villages in South Norfolk.

The historic core of Long Stratton along the A140 is a designated conservation area. Within the built up area there are some 30 listed buildings that front onto the existing A140.

In view of the above it is considered that the do-nothing scenario is not likely to be acceptable. This is because of the cumulative environmental effect the current and predicted traffic volumes will have on the village.

3.3.2 Non-road Options

The proposal for an A140 Long Stratton Bypass is essentially intended to address local environmental issues caused by substantial movements of non-local traffic. It does not necessarily sit within any wider transportation strategy.

Norfolk is a large rural county and the potential for managing travel demand on the A140 is limited, and likely to place unacceptable constraints on accessibility to Norwich and other parts of the county. In addition it is felt that traffic could not be sufficiently reduced to achieve the environmental improvements that are required in Long Stratton. In the same way, it is unlikely that a modal shift to rail or long distance buses could bring about sufficient reductions in traffic.

Additionally, the emerging regional spatial strategies are placing more reliance on the A140 as a route to Norwich and beyond. It is seen as a key sub-regional link, particularly when taken in the context of the recent de-trunking of the A12 route into Norfolk.

For these reasons it is unlikely that any non-road building option could mitigate the identified environmental issues.

3.3.3 On-line Improvement Option

During the late 1990's before the A140 was detrunked, a Highways Agency scheme comprising modifications to speed restrictions and traffic management works including gateway signing, 'Dragon Teeth' markings and carriageway roundel markings was introduced. These are comprehensive traffic management and safety measures and there is little scope for any further improvements.

Any attempt to improve design standards along the existing road through the urban core of Long Stratton would require significant demolition and land-take from properties fronting the A140. The impact of this on the conservation area is unlikely to be acceptable. Equally importantly, it may not resolve the issue of slow moving traffic and long traffic queues through the village as this is related to the number of junctions and accesses which are not likely to be reduced.

Since significant traffic management and safety measures have already been implemented and an improved route is unlikely to address the traffic impact, this course of action is unlikely to be acceptable.

3.3.4 Consultation Options

Bypass Options

Stage 2 assessment was undertaken on five route strategies, two to the west and three to the east. Each was considered to both dual and single carriageway standard. The five route strategies were :

- Option 1 – Western Red Route;
- Option 2 – Western Yellow Route;
- Option 3 – Eastern Blue Route;
- Option 4 – Eastern Green Route;
- Option 5 – Eastern Brown Route.

Option 1

The route leaves the A140 south of Wood Lane and swings north-west to a new roundabout junction, which provides a link back to the existing A140. From the roundabout the route, at existing ground level, cuts across Haynton's Lane to a new staggered ghost island crossroads junction with Stratton Road (for the single carriageway option), or under a proposed overbridge carrying Stratton Road (for the dual carriageway option). The route then swings around the western limits of the village in a shallow cutting to a new roundabout junction with Swan Lane/Chequers Road and Forncett Road. From this roundabout the route takes a north east alignment cutting across Brand's Lane and over a small stream on a slight embankment before joining a new roundabout at the A140/B1527/C497 (Hempnall crossroads) junction.

Option 2

From a new roundabout junction situated on the A140 just north of Parker's Lane this route follows a north west direction to a new priority ghost island junction with Stratton Road (for the single carriageway option), or under a proposed overbridge carrying Stratton Road (for the dual carriageway option). The route then swings around the western limits of the village in a shallow cutting to a new roundabout junction with Swan Lane/Chequers Road and Forncett Road. From this roundabout the route takes a north east alignment cutting across Brand's Lane and over a small stream on a slight embankment before joining a new roundabout at the junction with the existing A140/B1527/C497 (Hempnall crossroads) junction.

Option 3

This route leaves the A140 just north of Limetree Farm, from which point it follows a north easterly direction until it meets a new roundabout junction just north of Wild Rose Farm which provides a link back to the existing A140. From this point the route bends north eastwards cutting across Parker's Lane before passing in a cutting under a proposed overbridge carrying Hall Lane. From Hall Lane the route continues across Edge's Lane before it swings north westwards to join a new roundabout junction with the existing A140 at Church Lane.

Option 4

From a new roundabout junction situated on the A140 just north of Hawthorn Farm this route curves in a north easterly direction cutting across Parker's Lane before passing in a cutting under a proposed overbridge carrying Hall Lane. From Hall Lane the route continues across Edge's Lane until it swings north westwards to join a new roundabout junction with the existing A140 at Church Lane.

Option 5

This route leaves the A140 just north of Limetree Farm and swings north-east to a new roundabout junction near Wild Rose Farm, which provides a link back to the existing A140. From the roundabout the route follows a north easterly direction cutting across Parker's Lane before passing in a cutting under a proposed overbridge carrying Hall Lane. From Hall Lane the route continues northwards crossing Edge's Lane at existing ground level. It continues northwards cutting across Church Lane close to Thatched Cottage in a slight cutting before joining a new roundabout at the junction with the existing A140/B1527/C497 (Hempnall crossroads) junction.

The Preferred Route

All five route strategies at both dual and single carriageway standard were presented at public consultation in 2002. A copy of the public consultation leaflet is included as Appendix K. Approximately 3600 leaflets and questionnaires were distributed and over 1600 questionnaires were returned. Letters were received from over 40 organisations and businesses.

The western options would remove more traffic from the centre of the village than the eastern routes. The public consultation indicated that for a western route to be accepted

locally it would require roundabouts to be provided at both Forncett Road and Stratton Road. The addition of a roundabout instead of an overbridge at Stratton Road would reduce the overall cost of the dual carriageway options, however the cost is still more than an eastern route and the increased length of the route and junction delays would make it significantly worse from a cost benefit viewpoint.

A western route would on balance have greater adverse environmental impacts than an eastern route, affecting the Broads Environmentally Sensitive Area, river valley, Wacton Conservation Area and a large number of public footpaths. It would also cause greater agricultural severance than an eastern route.

During public consultation, concerns were expressed with regard to the proximity of the eastern routes to the new Churchfields housing estate, The Thatched Cottage, Church Lane, The Cedars, and about issues arising from the severance of Church Lane particularly access to the Church of St Michael.

The consultation indicated a very strong level of support for the principle of a bypass with the balance in favour of an eastern route. There was very limited support for Options 2, 3 and 4. Options 1 and 5 offer the greatest relief to the A140. They would allow construction of a roundabout at the B1527 junction to be an integral part of the bypass and provide a natural northern terminal for the scheme.

To address some of the concerns expressed relating to an eastern route a variation to the northern part of Option 5 was suggested during the public consultation with the route crossing Church Lane to the east of Stratton St Michael. The variation had a number of apparent social advantages, in distancing the route from residential properties and reducing the severance of Stratton St Michael and the Church of St Michael from Long Stratton.

A supplementary consultation was undertaken to consider four variants to the original public consultation Option 5. The four variants are summarised below:

- 5A - The original public consultation option with no overbridge at Church Lane;
- 5B - The original public consultation option with an overbridge at Church Lane;
- 5C - The variant alignment to the east of Stratton St Michael with no overbridge at Church Lane;
- 5D - The variant alignment to the east of Stratton St Michael with an overbridge at Church Lane.

Options 5A and 5B were further modified to adopt a curved alignment to move the route slightly further away from Churchfields housing estate.

The decision on which eastern route to choose was a finely balanced one. The variant routes would impact on an archaeological site of probable national importance. The original route would be closer to a greater number of properties in particular the properties on Churchfields housing estate. The original option 5 would have an impact on the setting of the Church of St Michael whereas the variant would break out further into the landscape to the east of Stratton St Michael. The variant would have a significantly greater impact on farming operations in the area due to severance of the bypass. An overbridge would address community severance issues for the original route

but itself would have a significant impact on the property known as Thatched Cottage. The variant route is longer and would provide a reduced cost/benefit ratio. The variant route is comparatively more expensive.

In choosing the standard of the road, the public consultation indicated a clear preference for a dual carriageway. The point had been made in favour of a single carriageway that it would cost less and therefore be more likely to achieve earlier funding. A dual carriageway layout gives a better rate of return. A dual carriageway layout would also provide more and safer overtaking opportunities along its length and fit better with any long-term proposals that might emerge for further dualling of the A140.

The Cabinet of Norfolk County Council adopted the original Option 5 with the curved alignment to dual carriageway standard with an overbridge at Church Lane as the preferred route in April 2003. The final decision was made after consideration of the subjective nature of the combined effects of all the issues.

3.3.5 Lower Cost and Next Best Alternative

A detailed appraisal has been carried out for an alternative scheme as required by the current advice. The alternative is the provision of a wide single 2-lane (WS2) standard, comprising a 10 metre wide carriageway following broadly the same alignment as the proposed scheme.

This alternative is based on the Option 5 single carriageway option presented during public consultation on route options, but modified to take into account issues arising during consultation and in the more detailed development of the preferred scheme.

This option is illustrated in Figure 3.11.

The total cost for this option including a risk allowance of 15% is £18.28 million (2005 prices).

A quantified appraisal for this alternative has been carried out and is reported in the Appraisal Summary Table in Appendix F. A TEE Table, Public Accounts Table, and AMCB Table are also included in Appendix F.

The lower cost scheme is also considered to be the next best alternative. Non-road options and an on line improvement are discussed and rejected in section 3.2.2 and 3.3.3 as they would not address the problems in Long Stratton. The only other option would be an alternative route for the bypass. The selection of the route for the bypass was made following a public consultation exercise in 2002/3 and is discussed in section 3.3.4.

3.3.6 Other Modes

Within the East of England region, car ownership is high but the level of accessibility offered by the bus and rail network is low (*Atkins – Norwich to Peterborough Multi-Modal Study*). The average number of trips made and the distance travelled per person (by all modes) is much higher than the national average, as is the proportion by car.

In terms of travel to work, the use of the car within the region is also higher than the national average which is reflected by the rural nature of the study area.

Long Stratton lies well outside the Greater Norwich area and any public transport benefits that might accrue from say the Norwich Public Transport Major scheme.

The Long Stratton to Norwich corridor is served by three main bus operators that provide a good level of service. Most of the services are provided on a commercial basis with no cost to the County Council. The regular services include a fully commercial service which operates Monday to Saturday every 30 minutes. The other services are more infrequent and operate between every 1.5 hours and every 2.5 hours Monday to Friday. Ticket prices along the corridor are relatively low due to the competition between operators.

Bus services provide a vital connection between the communities along the route.

The Norwich to London main railway line runs parallel to the A140 with main stops at Diss, Ipswich, Stowmarket and Colchester. The nearest station to Long Stratton is Diss with services approximately every 30 minutes southbound towards London and northbound to Norwich during the peak hours. These are already well used commuter routes.

Analysis indicates that rail offers the most direct and fastest journey time between Norwich and Diss and would therefore be the theoretically preferred method of travel between these centres, subject to access and egress time and the time of travel.

To assess the possible impact of model switch data from the Norwich Area Transportation Study (NATS) Saturn Model has been analysed. The Saturn Model provides an expanded matrix for the A140 based on a roadside interview site at Harford Bridge (north of the A47 Southern Bypass). This matrix is for the AM peak and is for two hours (0730 to 0930). The matrix has been analysed and only traffic which was deemed to originate or have its destination in the Long Stratton Zone or would go through Long Stratton in order to reach alternative origin and destination zones was considered.

This data showed that there were 1372 vehicles travelling southbound and 1396 vehicles travelling northbound which had origin and destination zones as detailed before.

Of the Southbound vehicles, 4% were Heavy Goods Vehicles, all of which had destinations in London and the South East, 30% of vehicles had destinations in Long Stratton or the surrounding area, 18% were heading for regional destinations, 23% were going to Ipswich, 20% to London and the South East and 5% to the rest of the UK.

Of the Northbound trips, only 2% were HGVs (all of which came from London and the South East), 64% were from Long Stratton and the surrounding area, 6% were from regional origins, 8% from Ipswich, 19% from London and the South East and 1% from the rest of the UK.

These figures highlight the diverse origins and destinations of trips which could use the proposed Long Stratton Bypass. Those trips which originate and have their destination in Long Stratton and the surrounding area can be assumed not to use the proposed bypass and possible improvements to local public transport may be something to be considered to help alleviate the number of trips.

Traffic on the A140 now has the opportunity to park at the Harford Park and Ride site. This popular site may have the effect of attracting traffic onto the A140, and then using the park and ride as it offers a more convenient and direct route into Norwich City centre than local public transport.

Of those trips that are 'through' trips, Ipswich and London and the South East are the main destinations for southbound traffic in the morning peak. The main public transport alternative (rail) is already in place and so optimistically, it can be assumed that some 10% of these trips may be suitable for modal switch. This would equate to 59 trips southbound and 37 trips northbound over the peak period (0730-0930).

Considering the small level of 'through' HGV movements, a reduction is unlikely to be achievable by sub-regional or local initiatives.

3.4 Capital Costs

3.4.1 Project Costs

The overall project cost is estimated at £22.44 million (2005 prices). This includes for all construction work and fees for their design and construction. Also included in the estimate is the acquisition of land together with an allowance for compensation claims under Part 1 of the Land Compensation Act 1973.

The cost of the purchase of the property known as Thatched Cottage under discretionary powers by the County Council in 2004 has not been included within the above cost estimate. The property is not directly affected by the scheme and will be resold after construction works are completed. The cost of the purchase of Thatched Cottage is shown in the expenditure profiles contained in Section 4.4.

At this stage a 15% value for contingencies/risk has been allowed in the estimate, which is considered appropriate given the relative simplicity of the engineering for the proposed scheme, and the detailed extent of the design already completed. Further details of Risk Assessment are included in Section 3.6.

A breakdown of the estimate is shown in Table 3.10.

Main Construction	£13,653,500
<i>Preliminaries</i>	£1,873,600
<i>Site Clearance</i>	£29,500
<i>Fencing</i>	£18,600
<i>Safety Fencing</i>	£301,400
<i>Drainage</i>	£2,544,800
<i>Earthworks</i>	£3,181,400
<i>Pavements</i>	£3,889,200
<i>Paved Areas and Kerbing</i>	£224,200
<i>Traffic Signs and Road Markings</i>	£109,800
<i>Road Lighting</i>	£64,600
<i>Structures</i>	£1,253,800
<i>Accommodation Works</i>	£74,300
<i>Provisional Sums</i>	£88,300
Other Works	£1,022,400
<i>Landscaping</i>	£349,800
<i>Ecological Mitigation</i>	£134,500
<i>Archaeological Excavation</i>	£538,100
Traffic Calming on the existing A140 through the village	£269,100
Public Utility Diversions	£474,500
Contingencies/Risk (15%)	£2,313,000
Land costs (including Agents fees)	£2,851,800
Design Fees (4%)	£823,400
Supervision (5%)	£1,029,200
Total Cost	£22,436,900

Table 3.10: Cost Estimate (2005 prices)

3.5 Operating / Maintenance Costs

The maintenance profile would envisage resurfacing of the existing road through the village and the bypass with surface dressing after 10/15 years with a structural wearing course overlay after 25 years. Surface dressing after 30/35 years with a structural overlay after 50 years. If the bypass is not constructed the existing A140 through the village will require the road surface to be replaced every 10 years and if it is constructed this could be increased to 20 years. Where the road passes through the central core of the village it is not possible to build up the level of the road surface and therefore the existing surfacing has to be removed prior to a new surface being laid.

No QUADRO assessment has been undertaken. A cursory manual appraisal indicates that the cost of user delays resulting from the resurfacing of the 'Do-Minimum' scheme will balance out the additional works cost to resurface the bypass. The difference in cost between the 'Do-something' and the 'Do-Minimum' is therefore not expected to be significant.

3.6 Risk Uncertainty and Optimism Bias

3.6.1 Risk Assessment

Estimating the cost of the risks identified in the risk register is not a straightforward task. *How to Construct a Public Sector Comparator (Treasury Taskforce, 1999)* suggests that comparison of outturn costs with original estimates for similar procurements can be used to derive the expected value for the cost of a risk. Historic data for a number of major highway schemes previously constructed by Norfolk County Council has been reviewed and the results are included in the table below.

Scheme	Original scheme estimate at Tender date (excluding contingencies)	Outturn cost	Cost increase	% increase
A143 Brockdish to Needham Bypass	£5.256m	£6.303m	£1.047m	19.9%
A149 Ormesby St Margaret Bypass	£2.823m	£3.217m	£0.394m	14.0%
A143 Broom to Ellingham Bypass	£7.160m	£8.247m	£1.087m	15.2%

Table 3.11: Historic Highway Scheme Outturn Costs

A risk assessment has been carried out by the project team and a provisional risk register is shown in Appendix C. The provisional register gives indications of the areas of risk and an assessment of the likely levels of risk. Where possible the cost of the risk has been estimated. Early contractor involvement and effective project management

including risk management and value management will significantly reduce risk in all of these areas.

The scheme will be procured using the Norfolk County Council Strategic Partnership with Mott MacDonald and May Gurney. Scheme design is already completed to a detailed level. Early Contractor Involvement has enabled quantities and rates to be checked by May Gurney resulting in a robust cost estimate.

By inspection of the risk register and the above table, it has been considered that an appropriate risk value for the proposed scheme is 15%.

3.6.2 Optimism Bias

Optimism Bias is the tendency to underestimate costs and over estimate benefits. Current TAG advice gives upper and lower bound limits of 44% and 3% for optimism bias adjustment for capital expenditure on standard civil engineering projects.

The general presumption is that the upper bound limit should be used unless strong justification is given for a lower level of bias. A risk assessment has been undertaken and the scheme costs include an allowance for risk. The Optimism Bias has been reduced in accordance with the supplementary guidance to HM Treasury's Green Book as summarised below (Table 3.12).

Contributory Factor	% Contribution to Optimism Bias	Risk Management Strategy	Mitigation Factor	Cost of Risk Management	Managed Optimism Bias Contribution
Late contractor involvement	3	Norfolk County Council Strategic Partnership	1.0	£0	3
Dispute on Claims Occurred	21	Risk allowance built into contingency	0.5		10.5
Environmental Impact	22	A full EIA has been undertaken	1.0	£0	22
Other	18		0.0		
Inadequacy of the Business Case	10	Extensive public consultation undertaken. Planning approval granted	1.0	£0	10
Poor Project Intelligence	7	Full topographical and ground investigation surveys undertaken	0.7	£0	4.9
Public Relations	9	General support for the scheme	0.7	£0	6.3

Site Characteristics	3	EIA identified advance mitigation works which have been programmed and costed	1.0	£0	3
Economic	7	The scheme is dependant on funding from central government through the Local Transport Plan process	0.0		

Table 3.12: Optimism Bias Risk Management Strategy

The resultant capital expenditure Optimism Bias = (100% - 59.7%) x 0.44 = 18%.

The cost of the scheme including 15% risk allowance and 18% Optimism Bias is £26.48 million (2005 prices).

The size of the Optimism Bias will reduce as project definition is further refined and strategies to manage risks are fully taken into account.

3.7 Traffic Modelling Assumptions

The traffic information required for assessment has been based on traffic modelling undertaken for the proposed scheme using local traffic count information. A fuller explanation of the traffic model is provided in Appendix G.

3.8 Assessment Against NATA Objectives

3.8.1 Introduction

Appraisal worksheets for the main proposal are included in Appendix D. A lower cost alternative is described in Section 3.3 above and appraisal worksheets for this alternative are included in Appendix E.

The appraisal worksheets were prepared as part of the environmental assessment work to support the planning application made in 2004. At the time the year of opening was assumed to be 2007.

An environmental constraints map is included as Figure 3.9.

3.8.2 Environment

Noise

Noise calculations have been carried out for dwellings adjacent to the bypass. The

methodology given in Calculation of Road Traffic Noise has been used. The results have then been expressed in terms of Estimated Population Annoyed (EPA) in accordance with the methodology in GOMMMS.

The calculations indicate that with the proposed improvement there would be significant noise increases for a relatively small number of dwellings and therefore EPA values are relatively low.

The construction and subsequent operation of the proposed scheme would inevitably generate some noise impacts.

The existing A140 creates noise that affects hundreds of buildings within several hundred metres either side of it. The proposed scheme would remove traffic from the existing route, which runs through the densely populated village of Long Stratton, and consequently reduce traffic flows by between 65% and 80%.

Baseline noise levels within the study area currently vary from between 70 and 80 dB on the western edge of the existing A140, to as low as 40dB at the far eastern and western edges of the study area and within the densely populated housing estates.

As a result of the scheme being put in place, 639 of the properties in the study area would experience at least a perceptible (more than 1dB) reduction in noise levels between the do minimum 2007 scenario and the with scheme 2022 scenario. This is mainly due to a reduction in traffic flow on the existing A140. Of these properties, 289 would experience a slight (3 to 5dB) reduction in noise, 49 a moderate (5 to 10dB) reduction and 4 would experience a substantial (10 to 15dB) reduction. Conversely, 357 properties would experience an increase in noise levels that could be considered at least perceptible. 111 of these properties would experience a slight noise increase, 159 a moderate increase and 4 would experience a substantial increase.

Local Air Quality

The Air Quality Strategy (AQS) for England, Scotland, Wales and Northern Ireland (DETR 2000) sets objectives for eight main air pollutants to protect health. It is expected that achieving the objectives for ambient concentrations of NO₂ and PM₁₀ will be more challenging than for the other pollutants such as VOCs, CO, benzene and trace metals. Hence, GOMMMS assessments concentrate solely on the levels of NO₂ and PM₁₀ as indicators of air quality.

The assessment was based on forecast traffic figures and has indicated an increase in PM₁₀ and NO₂ emissions when comparing the bypass option with the existing layout in both 2007 and 2022.

It should be noted that vehicle emissions are anticipated to reduce in future years as a result of improved vehicle efficiencies. This will have the effect of offsetting some of the beneficial effects achieved through Long Stratton.

The proposals to bypass the village of Long Stratton would significantly reduce local congestion hence a subsequent reduction in emissions is predicted. In general due to

improvement in vehicle design, emissions from vehicles and particles from road traffic would decline between today and the opening year of the scheme.

In terms of health effects on the residents of Long Stratton the impacts would on the whole be beneficial. None of the air quality regulations would be exceeded.

Although a number of properties along the proposed bypass route would experience an increase in the level of exposure to PM₁₀ and NO₂, this is not considered to be significant.

Overall 55 properties will experience a decrease in air quality and 994 properties will benefit from improved air quality.

Greenhouse Gases

Greenhouse gases are considered for the purposes of assessing the impacts of transport options on climate change. CO₂ is considered to be the most important greenhouse gas and is a direct result of the consumption of carbon based fuels. An increase in fuel consumption results in an increase in CO₂ emissions and hence an assessment of CO₂ is used as a key indicator in relation to this change.

The total mass of vehicle emissions for the proposals to bypass the village of Long Stratton have been estimated for the opening (2007) and design (2022) years for the proposed scheme (do-something) and the do minimum scenario. The results are summarised below in Table 3.13.

	2001	2007		2022	
		Do something	Do min	Do something	Do min
Carbon monoxide (kg/year)	66481	33585	30875	28160	29452
Benzene (kg/year)	10407	4488	4799	3904	4416
Oxides of nitrogen (kg/year)	51729	39033	33466	22703	19708
Carbon dioxide (tonnes/year)	6364	7664	6416	8137	7067
Particulate matter (kg/year)	1512	1330	979	805	515

Table 3.13 Summary of the schemes total emissions contributing to overall air pollution

The calculation of vehicle emissions indicates that for the do-minimum scenario between 2001, baseline and 2007, the opening year emissions of carbon monoxide, benzene, oxides of nitrogen and particulate matter are all predicted to fall, while carbon dioxide levels would increase.

In the opening year the total emissions of carbon dioxide, oxides of nitrogen carbon dioxide and particulate matter in the study area would be greater than the do minimum

scenario of that year. However emissions of benzene would reduce by approximately 6% with the scheme in place (do-something) when compared to the do minimum in the opening year.

By 2022 levels of carbon monoxide and benzene are predicted to reduce by 4% and 22% respectively between the scheme and do minimum scenarios.

The main reasons for these changes are due to the speed and composition of the traffic. Improvements in fuel technology and fuel specifications also play a part in the change in emission levels.

The assessment of the contribution of greenhouse gas emissions is limited to road traffic emissions of CO. CO₂ is predicted to increase by 10% between the 2007 and 2022 do minimum scenario, however the proposed scheme would only result in a 6 % increase of CO₂ levels for the same period. This is comparable with the projected national increase from the transport sector.

Landscape

In general terms the landscape character throughout the central and southern parts of the study area consists predominantly of large arable fields giving rise to an open landscape with a lack of mature vegetation features, although some tall hedges and woodland copses punctuate the area. Beyond Stratton St Michael to the north of the study area however, the landscape is of higher quality on account of the more undulating topography combined with a greater proportion of mature hedges, hedgerow trees and woodland blocks. Another area of higher quality landscape is a small area of urban fringe landscape on the eastern side of Long Stratton (including the area around the church at Stratton St Michael), and around Hall Farm, which consists of a mix of small pasture fields enclosed by mature hedgerows and the mature well wooded grounds of larger properties.

Generally, the large scale of the farmed landscape is such that it would be possible to visually accommodate the new road scheme, which would be viewed within the context of the village of Long Stratton. However, this would not be possible within the much more intimate small scale landscape in the vicinity of Stratton St Michael, where the new road would have a significant adverse effect on landscape character. However, to some extent this could be mitigated by extensive tree planting and mounding in the vicinity of the settlement, which would help to both screen affected properties and also to blend the road into the surrounding landscape. Properties on the edge of the new housing estate either side of Edge's Lane would also be in close proximity to the new road, although extensive mitigation measures in the form of mounding and tree planting would reduce the impact, particularly over time as the planting matures.

For these reasons the scheme has been assessed as having a moderate adverse effect in landscape terms using the GOMMMS criteria, but reducing as landscape planting matures. However, the proposed improvement has been aligned to minimise where possible adverse effects. Consideration has been given to mitigation measures, and the schematic landscape plan in Figure 3.6 shows preliminary proposals for these.

Townscape

A study of the built heritage of the area identified sixteen listed buildings close to the route corridor.

The proposals to bypass the village of Long Stratton would have a significant benefit to the listed buildings and the conservation area along the existing A140. Although a number of properties to the east of the village would become closer to the road, the distance to these buildings means the effects would be expected to remain minor.

A major negative effect has been identified on the cluster of properties at Stratton St Michael, where the bypass would affect the setting of these properties and create a level of visual intrusion. The setting of Thatched Cottage, a grade two listed building, would be significantly affected. As the road would be less than 40m away the effect is considered to be adverse.

The overall assessment is moderate beneficial.

Heritage of Historic Resources

Five archaeological sites and/or findspots of regional/county importance have been identified as lying within the landtake area for the proposed scheme. These sites comprise:

1. HER 7947 Roman Road at each end of the route. The current A140 follows the alignment of Roman road 7947.
2. HER 12513 Romano-British settlement with Iron Age, Middle Saxon and Medieval finds.
3. HER 15801 Findspot of Romano-British and Medieval pottery. Local tradition of site of early church.
4. HER 14109 Medieval pottery scatter.
5. HER 14118 Cropmark site of Medieval hollow way and house platforms, and Romano-British pottery findspot.

Field evaluation was carried out on the Romano-British settlement (HERs 12513, 15801) the Medieval cropmark site and Romano-British pottery findspot (HER 14118) and the Medieval pottery scatter (HER 14109) to characterise the survival of subsurface deposits. Deposit preservation at the Romano-British site was found to be exceptional with extensive demolition deposits containing the remains of buildings (post-holes, floor surfaces, gullies, worked stone, roof and floor tiles), midden debris and roads adjacent to the existing A140 with settlement deposits decreasing in density and complexity towards the east.

Archaeological features and deposits for the medieval cropmark and pottery findspot site (HER 14118) comprised a small number of shallow pits, ditches, post-holes and the remains of a hollow way dating to the 11th to 14th centuries. The small number of features recorded for this site suggest some kind of extensive activity possibly related to

farming. A possible Neolithic/bronze Age artefact scatter was also identified within the northern part of the site.

Archaeological features for the Medieval pottery scatter (HER 14109) comprised a single 18th century field boundary ditch. Two sherds of 11th century pottery were also recovered from the ploughsoil.

The proposed scheme will have a severe impact on archaeological remains occurring within the landtake area for the scheme. Construction excavations will destroy all archaeological deposits and features within the roadline and severely compromise the integrity of the sites by the loss of associated deposits. The most severe impact of the scheme will be on the surviving deposits of the Romano-British settlement where all deposits intersected by the main carriageway, roundabout and slip and access roads will be destroyed by groundworking operations. An equally severe impact will be on the Medieval cropmark and pottery findspot site where construction excavations will also destroy all surviving archaeological features within the landtake area.

Proposed mitigation measures comprise preservation by record in advance of their destruction. The Romano-British site (HERs 12513, 15801) will require the excavation of two areas intersected by the proposed road and slip road in advance of construction. The medieval cropmark and pottery sites (HER 14118 and 14109) will require a watching brief during construction for the salvage recording of any archaeological features exposed by the works. In addition to these mitigation measures an archaeological watching brief will also be required to allow for the identification and salvage recording of any unknown archaeological remains exposed by construction works elsewhere along the preferred roadline.

There are known archaeological remains likely to be affected by the proposed improvement, and no listed buildings or structures would be affected. For these reasons the scheme was rated as 'moderate adverse' under the GOMMMS criteria for Heritage of Historic Resources.

Biodiversity

The alignment of the bypass traverses mainly arable fields. The proposals would result in a number of minor ecological impacts.

A small number of hedgerows and trees would be lost to the scheme; mitigation measures include a comprehensive planting scheme of new hedgerows, tree and shrub planting. Also the impact on the habitat contained within the ditches and areas of grassland area would be minor.

Two ponds would be lost due to the alignment of the road. A small population of great crested newts is present in each of the ponds.

Wood Green County Wildlife Site lies approximately 600m to the east of the bypass; no impacts associated with the proposals are predicted.

Extensive ecological surveys have ensured that impacts on species are reduced, mitigation measures implemented and, where possible, measures to enhance the wider biodiversity of the area would be incorporated into the scheme proposals.

The impact for biodiversity has therefore been rated as 'slight adverse' under the GOMMMS criteria.

Water Environment

The drainage of the proposed Long Stratton Bypass is designed to ensure that the hydrology and environment in the area would not be adversely affected. To ensure this, an arrangement of Sustainable Drainage Systems (SuDS) would be introduced. Increased run-off as a result of the bypass would be detained on site and released only to an Environment Agency agreed maximum flow.

In addition run-off from the bypass would be filtered through gravel and vegetation in drains and ponds to remove sediments, suspended solids and pollutants, thus ensuring that the wider environment would not be affected.

Physical Fitness

The substantial reduction in traffic on the existing A140 through Long Stratton will offer major benefits to pedestrians, cyclists and the general community.

Traffic calming and improved facilities for pedestrians and cyclists can be undertaken on the existing road through the village following diversion of through traffic to the new scheme.

The new road severs a number of lanes and public footpaths. Providing all-purpose over bridges at Hall Lane and Church Lane and a pedestrian/cycle overbridge at Edge's Lane will mitigate these impacts. At Parker's Lane an at-grade crossing provision will be provided. Elsewhere the footpath network will be diverted and strengthened. The existing and proposed equestrian, pedestrian and cycle routes are shown on Figure 3.10. Overall the effect on public rights of way is considered to be neutral.

The proposals do not affect any bridleways or future strategies for provision of bridleway routes. A new bridleway link is included between Parker's Lane and Hall Lane to allow for possible future development of an east-west equestrian route.

To the east of the village (bypass side) pedestrian journeys are likely to be recreational, for instance dog walking. There is little observed cycling, but this has the potential to be more than just recreational. The County Council is studying village link cycle strategies and in this area possible routes into Long Stratton from the east would come via Edge's Lane and Hall Lane.

There is significant pedestrian activity within the centre of Long Stratton particularly associated with the shops and other local services, but very little observed cycle use.

It is difficult to estimate meaningful journey times in this area. In general the proposals across the new road maintain existing links for pedestrians and cyclists. Traffic

reduction in the central core of Long Stratton will contribute to an enhanced environment that is more conducive to pedestrian and cycle use.

Journey Ambience

There are more better effects on vehicle travellers resulting from the scheme. In the year of opening (2007) it is predicted that some 13,000 vehicles would use the bypass each day. Therefore the overall assessment shows a large beneficial effect.

Statutory Consultees

The scheme has been subject to extensive public consultation through the route selection process between September 2002 and April 2003.

There was on-going consultation during the development of the proposed scheme with affected landowners, residents and statutory consultees in particular Environment Agency and English Nature.

The proposed scheme was subject to Planning Application processes between September 2004 and February 2005. This required widespread formal consultation.

Evidence of consultation with the statutory bodies, including responses received, is contained in Appendix J.

3.8.3 Safety

Accidents – Road Safety

The change in accidents from the 'Do-Minimum' to the 'Do-Something' have been assessed using the COBA cost benefit analysis program. The results are shown in Table 3.16 and Table 3.19.

Security

The proposed route passes through a rural landscape, but dissects a number of lanes and footpaths with consequent implications for the security of pedestrians and cyclists. These impacts are mitigated by comprehensive alterations to the rights of way network, as shown on Figure 3.10.

Pedestrians and cyclists will be able to cross the new road via overbridges at Church Lane and Hall Lane and a footbridge at Edge's Lane. At Parker's Lane present and anticipated pedestrian use is very low. Rather than close the route completely it is proposed to provide a pedestrian crossing point via a stagger in the central reserve safety fence.

Along the new road one new layby will be provided in each direction. It is not intended to provide emergency telephones.

At the A140/B1527 junction off carriageway cyclepaths will be provided to aid cyclists through the junction.

The overall assessment of the security impact of the proposed improvement is neutral.

3.8.4 Economy

Introduction

This section outlines the cost benefit analysis undertaken for this submission. The analysis follows the advice set out in TAG to identify the total costs of the scheme, and the financial and economic benefits.

Methodology

An economic appraisal has been undertaken in accordance with DfT guidance for major schemes. The results for the proposed scheme are presented in this section. The traffic model used for assessment of this scheme based on locally collected survey data. Further details are given in Appendix G.

The Department's Cost Benefit Analysis software (COBA) has been used to evaluate economic factors.

In this instance the Department's Transport User Benefit Appraisal (TUBA) has not been used as the proposed scheme is a conventional rural village bypass and the only significant change in trip patterns will be the re-assignment of traffic.

Table 3.16 outlines the assumptions used in the appraisal.

Assumption	Value
Price base	2002
Current year	2005
Discount factor Years 1 to 30 (% p.a.)	3.5%
Discount factor Years 31 to 60 (% p.a.)	3.0%
Scheme opening year	2007
Scheme design year	2022
Evaluation period	60 years

Table 3.14: Economic Appraisal Assumptions

Capital Costs

Capital costs for the scheme in factor costs at 2005 prices are outlined in Section 3.4. These costs are based on detailed preliminary design work for the scheme and have been checked by May Gurney. Land costs have been estimated by Norfolk Property Services who have knowledge of local land values.

The following assumptions have been made regarding the phasing of costs:

- Construction costs including public utility diversions: 47% in 2006/7, 51% in 2007/8; 2% in 2008/9;
- Land costs: 1% in 2005/6, 14% in 2006/7, 2% in 2007/8, 8% in 2008/9, 52% in 2009/10, 21% in 2010/11, 2% in 2011/12;
- Design fees: 18% in 2005/6, 28% in 2006/7; 27% in 2007/8, 27% in 2008/9;
- Supervision: 34% in 2006/7; 33% in 2007/8, 33% in 2008/9.

There is no potential for contributions to be made from developers towards the cost of the scheme.

Economic Benefits

The results of the economic assessment are summarised in the TEE table (Table 3.17). Values have been rounded to the nearest £0.1million.

It can be seen that the total Present Value of Transport Economic Efficiency Benefits is £63.5 million. Accident benefits of £14.4 million have been added to produce a Present Value of Benefits of £77.9 million.

Public Accounts

The total Present Value of Costs is £19.6 million.

Business Users and Providers

The net business impact totals benefits of £33.8 million. This includes a £34.5 million saving in travel time, and an increase of £0.8 million in operating costs.

Consumer Users

The net impact on consumers totals benefits of £29.6 million. This includes a £31.6 million saving in travel time and an increase of £2.0 million in operating costs.

Reliability

Route reliability has been determined using the stress based approach detailed in TAG Unit 3.5.7. The assessment of stress is calculated as the ratio of annual average daily traffic (AADT) flow to the Congestion Reference Flow (a definition of capacity). As the reliability of road journey time is believed to decline as flows approach capacity, stress is, with some limitations, considered to be a reasonable proxy for reliability.

The assessment has been based on Design Year forecast traffic figures and, in accordance with the guidance, stresses have been constrained to lie within the range of 75% to 125%.

The overall assessment score is neutral.

The confined nature of the existing road is likely to result in variable traffic speeds depending upon vehicle type etc. which may, in turn, be leading to unpredictable and unreliable journey times. A bypass will reduce these influences and produce more consistent and reliable journey times.

Wider Economic Impacts

A benefit of the bypass may be to improve HGV route reliability journey times along the A140 corridor and beyond.

3.8.5 Accessibility

Option Values

No new public transport elements are included in the proposed improvement and hence there are no additional options being made available.

The overall assessment for the option is neutral.

Severance

The Severance sub-objective is concerned with the change in severance affecting those using non-motorised modes, especially pedestrians. Severance is classified in four broad levels:

- None - Little or no hindrance to pedestrian movement;
- Slight - All people wishing to make pedestrian movements will be able to do so, but there will probably be some hindrance to movement;
- Moderate - Some people, particularly children and old people, are likely to be dissuaded from making journeys on foot. For others, pedestrian journeys will be longer or less attractive;
- Severe - People are likely to be deterred from making pedestrian journeys to an extent to induce a reorganisation of their activities. In some cases, this could lead to a change in the location of centres of activity or to a permanent loss of access to certain facilities for a particular community. Those who do make journeys on foot will experience considerable hindrance.

Severance resulting from the existing road has been assessed as moderate, i.e. some people wishing to make pedestrian movements will be dissuaded from doing so. The proposed dual carriageway, and resulting severance is assessed as slight. The overall assessment for the option is slight adverse.

Access to the Transport System

The proposed A140 Long Stratton Bypass does not contain explicit public transport enhancements.

The overall assessment for the option is neutral.

3.8.6 Integration

Transport Interchange

Improving interchange is identified in the Government's white paper 'A New Deal for Transport' (DETR, 1998) as a key factor in achieving truly integrated transport. Aspects that must be considered in any estimation of a scheme's effect on interchange quality for either passengers or freight are laid out in TAG. Effects on the waiting environment, the level of facilities and the quality of information should be considered.

This scheme will not have a direct effect on the quality of the transport interchange in the covered area. Improvements of road conditions might give increased reliability of transport giving better interchange conditions for both passenger and freight but this effect cannot be estimated.

The bypass effect on current freight or passenger interchange quality is neutral.

Land Use Policy

The project is consistent with the sub-regional strategy for the Norwich area. It will assist in the aim to regenerate this sub-region by facilitating improved access to the Norwich built up area.

Other Government Policies

With regard to the 4 shared priorities, the project will have a beneficial impact in terms of reducing interurban congestion in Long Stratton. This in turn should confer local air quality and quality of life benefits to the residents of Long Stratton. There will be road safety benefits and there may also be accessibility benefits by way of more reliable bus services due to the removal of the congestion problem in Long Stratton.

3.8.7 Appraisal Summary Table

The AST is shown in table 3.16. Worksheets are given in Appendix D.

3.9 Transport Economic Efficiency Data

Transport Economic Efficiency data is shown in Table 3.17.

3.10 Scenario and Sensitivity Tests

A sensitivity test has been carried out with a range of possible levels of optimism bias. Uplifts of 18%, 40% and 66% have been added in accordance with advice from TAG Unit 3.9.4 and the economic assessment reworked. The results are given in Table 3.15.

<i>Analysis of Monetised Costs and Benefits</i>			
<i>Units £,000's, 2002 prices, discounted to 2002</i>			
	<i>18% Optimism Bias</i>	<i>40% Optimism Bias</i>	<i>66% Optimism Bias</i>
<i>Consumer User Benefits</i>	29,638	29,638	29,638
<i>Business Benefits</i>	33,693	33,693	33,693
<i>Private Sector Provider Impacts</i>	145	145	145
<i>Accident Benefits</i>	14,376	14,376	14,376
<i>Present Value of Benefits (PVB)</i>	77,852	77,852	77,852
<i>Public Accounts</i>	23,521	28,360	34,079
<i>Present Value of Costs (PVC)</i>	23,521	28,360	34,079
<i>OVERALL IMPACTS</i>			
<i>Net Present Value (NPV)</i>	54,331	49,492	43,773
<i>Benefit to Cost Ratio (BCR)</i>	3.310	2.745	2.284

Table 3.15: Economic Performance Table – with Optimism Bias Uplifts of 18%, 40% and 66%

Table 3.16: Appraisal Summary Table - Proposed Scheme

Option	Description	Problems	Present Value Cost
A140 Long Stratton Bypass	Approximately 5km length of carriageway of which three quarters will be dualled passing to the east of the village of Long Stratton, with connections to the existing road network via roundabouts at either end of the scheme. Two all purpose over bridges and cycle/pedestrian over bridge.	Congestion in the centre of Long Stratton with associated noise, air quality and safety issues. Status: Primary principal road Current traffic flow: approx. 18000 vehicles/day. Current %age of HGV: approx. 9%.	PVC to public accounts: £19.6m

OBJECTIVE	SUB-OBJECTIVE	QUALITATIVE IMPACTS	QUANTITATIVE MEASURE	ASSESSMENT
ENVIRONMENT	Noise	The total estimated population annoyed within the study area declines by almost 50% in the do something scenario. Properties located directly adjacent to the existing A140 will experience the greatest noise benefits due to lower traffic flows. There will be some minor to substantial increases in noise levels at properties located near to the proposed scheme.	Do Minimum Population Annoyed: 221 The Scheme Population Annoyed: 113	Moderate beneficial The estimated population annoyed by road traffic noise in Long Stratton is expected to decrease by 108 people (49%) as a result of the scheme
	Local Air Quality	Overall improvement in air quality due to removal of traffic from the centre of Long Stratton where high numbers of properties are within 200m of the existing A140.	Total increase of PM ₁₀ 101.58µg/m ³ Total reduction of NO ₂ 1221.62µg/m ³ 980 properties would experience an improvement in air quality 2 properties with no change 56 properties would experience a reduction in air quality.	Moderate beneficial
	Greenhouse Gases	With this scheme in place greenhouse gas emissions in 2022 would be 27% greater than those for the Do Minimum in the Opening Year of 2007. The results also show that with the strategy in 2022 the greenhouse gas emissions would be 15% greater than the do-minimum in 2022.		Negative when compared against both 2007 and 2022 Do Minimums.
	Landscape	Large scale open arable landscape which will generally be able to accommodate the scale of the road, although this will not be the case where the route passes through the hamlet of Stratton St Michael.		Moderate adverse
	Townscape	Long Stratton is an attractive and thriving rural market town that will greatly benefit from the removal of through traffic from the town centre.		Moderate beneficial
	Heritage of Historic Resources	Removal of traffic from the town centre will generally improve the setting of some listed buildings, although the new route will affect the setting of listed buildings in Stratton St Michael. Five sites of known archaeological interest will be directly affected.		Moderate adverse
	Biodiversity	Majority of scheme passes through arable land of low ecological value. However, several ponds would be affected which may contain Great Crested Newts, however detailed mitigation measures have been developed to reduce the level of impact.		Slight adverse
	Water Environment	Assuming construction impacts are mitigated, the overall impact of the proposed improvement would be marginally beneficial due to reduced risk of accidents causing severe pollution events.		Neutral

Option	Description	Problems	Present Value Cost									
A140 Long Stratton Bypass	Approximately 5km length of carriageway of which three quarters will be dualled passing to the east of the village of Long Stratton, with connections to the existing road network via roundabouts at either end of the scheme. Two all purpose over bridges and cycle/pedestrian over bridge.	Congestion in the centre of Long Stratton with associated noise, air quality and safety issues. Status: Primary principal road Current traffic flow: approx. 18000 vehicles/day. Current %age of HGV: approx. 9%.	PVC to public accounts: £19.6m									
OBJECTIVE	SUB-OBJECTIVE	QUALITATIVE IMPACTS	QUANTITATIVE MEASURE	ASSESSMENT								
	Physical Fitness	It is possible that the scheme will cause an increase in physical activity due to the enhancement of the public footpath network.	No data available	Moderate beneficial								
	Journey Ambience	Improved information, reduced frustration and reduced fear of accidents will reduce traveller stress.		Large beneficial								
SAFETY	Accidents		<table border="1"> <thead> <tr> <th>Accidents</th> <th>Fatal</th> <th>Serious</th> <th>Slight</th> </tr> </thead> <tbody> <tr> <td>-153</td> <td>-8</td> <td>-46</td> <td>-215</td> </tr> </tbody> </table>	Accidents	Fatal	Serious	Slight	-153	-8	-46	-215	PVB: 14.4
	Accidents	Fatal	Serious	Slight								
-153	-8	-46	-215									
	Security	Neutral overall impact.		Neutral								
ECONOMY	Public Accounts			PVC: 19.6								
	Business Users & Providers		Users PVB: 33.7 Transport providers PVB: 0.1	PVB: 33.8								
	Consumer Users		Users PVB: 29.6	PVB: 29.6								
	Reliability	More consistent and reliable journey times.	Do minimum stress 83% Do something stress 75%	Neutral								
	Wider Economic Impacts	It is possible that that the bypass may improve HGV route reliability journey times along the A140 corridor and beyond.		Neutral								
ACCESSIBILITY	Option Values	No additional options.		Neutral								
	Severance	Reduced community severance due to the removal of through traffic from the village.		Moderate positive								
	Access to the Transport System	No direct impact.		Neutral								
INTEGRATION	Transport Interchange	No direct impact.		Neutral								
	Land-Use Policy	Consistent with sub regional strategy for the Norwich area.		Neutral								
	Other Government Policies	Improved local air quality and quality of life for residents in Long Stratton. Possible improvements in reliability of bus services due to the removal of congestion problems.		Slight beneficial								

Table 3.17: TEE Table – Proposed Scheme (with 15% risk allowance)

Economic Efficiency of the Transport System (TEE) for the Appraisal of Major Highway Schemes

Units £,000s, 2002 prices, discounted to 2002

Consumer User Benefits				
<i>User benefits</i>	TOTAL	CARS AND PRIVATE LGVS	GOOS VEHICLES AND BUSINESS LGVS	BUS AND COACH
Travel time	31646	29693		1953
Vehicle operating costs	-2008	-2008		
Travel time and vehicle operating costs:				
During construction	0			
During maintenance	0			
NET CONSUMER BENEFITS	29638	27685		1953
Business				
<i>User benefits</i>				
Travel time	34502	20410	13408	684
Vehicle operating costs	-809	-255	-554	
Travel time and vehicle operating costs:				
During construction				
During maintenance				
Subtotal	33693	20155	12854	684
<i>Private sector provider impacts</i>				
Operating costs	145			145
<i>Other business impacts</i>				
Developer and other contributions				
NET BUSINESS IMPACT	33838			
TOTAL				
Present Value of Transport Economic Efficiency Benefits	63476			

Table 3.18: Public Accounts Table – Proposed Scheme (with 15% risk allowance)

Public Accounts
Units £,000s, 2002 prices, discounted to 2002

	ALL MODES TOTAL	ROAD Infrastructure	Bus and Coach	RAIL	Other
Local Government Funding					
Revenue					
Operating Costs					
Investment Costs					
Developer and Other					
Contributions					
Grant/Subsidy Payments					
NET IMPACT					
Central Government Funding					
Revenue					
Operating costs	1229	1229			
Investment Costs	21996	21996			
Developer and Other					
Contributions					
Grant/Subsidy Payments					
Indirect Tax Revenues	-3663	-3663			
NET IMPACT	19562	19562			
TOTAL Present Value of Costs (PVC)	19562	(9) = (7) + (8)			

Notes: Costs appear as positive numbers, while revenues and 'Developer and Other Contributions' appear as negative numbers.

Table 3.19: AMCB Table – Proposed Scheme (with 15% risk allowance)

Analysis of Monetised Costs and Benefits
Units £000s; 2002 prices, discounted to 2002

Noise		
Local Air Quality		
Greenhouse Gases		
Journey Ambience		
Accidents	14376	
Consumer Users	29638	
Business Users and Providers	33838	
Reliability		
Option Values		
Present Value of Benefits ^(see notes) (PVB)	77852	
Public Accounts	19562	
Present Value of Costs ^(see notes) (PVC)	19562	
OVERALL IMPACTS		
Net Present Value (NPV)	58290	<i>NPV=PVB -PVC</i>
Benefit to Cost Ratio (BCR)	3.980	<i>BCR=PVB /PVC</i>

Note : This table includes costs and benefits which are regularly or occasionally presented in monetised form in transport appraisals, together with some where monetisation is in prospect. There may also be other significant costs and benefits, some of which cannot be presented in monetised form. Where this is the case, the analysis presented above does NOT provide a good measure of value for money and should not be used as the sole basis for decisions.

3.11 Supporting Analysis

3.11.1 Distribution and Equity

Modal share monitoring research undertaken by OPERA Research for Norfolk County Council in 2004 provides a socio-economic profile of transport users resident in South Norfolk District.

Table 3.20 shows that 56% of car journeys made by South Norfolk residents are undertaken by people in socio-economic groups A, B and C1; journeys undertaken by these groups represent some 52% of journeys by all modes. 44% of car journeys are undertaken by people in socio-economic groups C2, D and E; journeys undertaken by these groups represent some 48% of journeys by all modes.

Socio-economic group Percentage of sample making trips involving:

	Bus	Car	All modes
ABC1	44	56	52
C2DE	56	44	48
Total	100	100	100

Table 3.20: Socio-economic Profile of South Norfolk Transport Users

A significant majority of the benefits will be to car users. Therefore, based on the average figures above, the scheme will be of slightly more benefit to ABC1's than to C2DE's; however, the difference in benefits is relatively small. It should also be noted that low income groups own cars by necessity in rural areas such as Norfolk. Also, there will be benefits to other users for example people waiting for the bus and also improved reliability of buses. Therefore it is considered that the distribution of benefits between socio-economic groups is uncertain.

3.11.2 Affordability and Financial Sustainability

The results of the economic assessment of the proposed improvement are reported in the TEE and AST, and indicate that the scheme will produce a NPV of £58.3 million and a Benefit Cost ratio of 3.980.

As this is not a public transport scheme, the financial performance has not been considered further.

3.11.3 Practicality and Public Acceptability

Practicality

The proposed bypass is subject to the normal statutory processes for a scheme of this type. A planning application was submitted in September 2004 and compulsory purchase and side roads orders are being prepared to publish in 2005. Dependent upon objections received, a Public Inquiry may then take place.

The proposal is robust in engineering and economic terms. To date there has been significant support for the proposal from a range of public and private sector bodies. Norfolk County Council has stated that construction of the proposed improvement is a priority.

Preliminary design work indicates that the proposals are practical, and no serious obstructions to construction of an engineering nature have been revealed. There will be a need for advance works to put in place protected species mitigation particularly in respect of the great crested newt. A detailed archaeological study is also required of a Romano-British site towards the southern end of the scheme.

Public Acceptability

The public consultation exercise carried out between September 2002 and April 2003 indicated clear local support for the bypass. Details are given in Section 3.3.

As the scheme progressed through the detailed preliminary design stages the Council continued to involve the public, stakeholders and statutory consultees. The scheme was generally well supported. Where issues were raised these in the main related to matters of detail in respect of the mitigation of environmental effects.

A planning application was made in September 2004. This has required formal consultation with the public. Responses are set out in Appendix J.

As part of the ongoing programme of scheme delivery, the Council will continue to keep informed and consult the public and stakeholders on this project.

Statutory Bodies

All appropriate statutory bodies were consulted during route selection processes and again as part of the formal planning application. Consultation responses from statutory bodies are set out in Appendix J.

3.11.4 Contribution to Ten Year Plan Targets

The strategy contained in the new White Paper – “The Future of Transport – a network for 2030”, builds upon the progress made against the Government’s 10-Year Plan for Transport. Many of the themes outlined in this White Paper are being taken forward in the Local Transport Plan (LTP) for Norfolk. The notable exceptions being rail infrastructure and air travel which are outside the remit of the Council and not relevant to Long Stratton.

Because the Local Transport Plan targets tend to reflect changes at a countywide level, it would be unreasonable to expect the scheme to make a significant individual contribution. However, targets in the Local Transport Plan which the Long Stratton bypass will impact upon are:

- Best Value Performance Indicator (BVPI) 99 – Road traffic accident casualties
- No increase between 1994-98 and 2010 in the number of people slightly injured in road traffic accidents, despite increasing traffic levels

- 50% decrease between 1994-98 and 2010 in the number people killed or seriously injured in road traffic accidents
- 70% decrease between 1994-98 and 2010 in the number children killed or seriously injured in road traffic accidents
- BVPI 102 Public transport patronage - Increase bus patronage by 25% between 2003/04 and 2010/11
- BVPI 104 satisfaction with local bus services - Increase bus satisfaction levels to 62% by 2010/11
- LTP3 – Levels of cycling across Norfolk - Increase the number of cycling trips by 5% between 2004/05 and 2010/11
- LTP4 – Mode share of Journeys to school - To reduce the number of car journeys to school by 10% between 2005/06 and 2010/11
- LTP5 – Bus punctuality – Increase the proportion of buses on time to 90% by 2010/11

Improvements to these targets will be brought about by the transfer of traffic to a new and safer road, better bus journey times through Long Stratton, and the improvements in conditions and reduced danger in Long Stratton for other modes such as walking and cycling, especially for children walking to school.

Road safety and public transport are our priorities in the second LTP and are likely to be considered stretching when benchmarked against other authorities. These are also a corporate priority and this is reflected in the setting of stretching targets for casualty reduction countywide and bus passengers in the Norwich Sub-Region as part of our second Local Public Service Agreement with the Government in 2004.

3.12 Overall Value for Money Conclusions

Economic assessment using COBA for the proposed scheme with a 15% risk allowance indicates a Benefit Cost Ratio of 3.980.

The scheme is considered to be high value for money in accordance with guidance published on the DfT website in December 2004.

The DfT 'Guidance on Value for Money' requires assessment of the value for money of the scheme to include impacts on environment, regeneration, accessibility and integration as well those that can be expressed in monetary terms.

The combined non-monetised impacts are not considered to be significant relative to costs to change the value for money category indicated by the Benefit Cost Ratio alone.

4.0 Delivery and Implementation

4.1 Project Management Processes

The County Council has adopted the principles of 'Rethinking Construction' for which it achieved Beacon Status for construction in 2003-2004. The Council has entered into a Strategic Partnership with Mott MacDonald and May Gurney to provide a full integrated project delivery service fully embracing 'Early Contractor Involvement' (ECI).

The Council and its strategic partners have considerable experience and a proven record in delivering high quality road and bridge projects such as Long Stratton Bypass. Regular project progress meetings will ensure that all aspects of the project are fully resourced in order to meet the project programme.

The most recent Local Transport Plan Annual Progress Report was rated 'well above average' and ranked equal fourth nationally, largely on the basis of its efficient and effective delivery of schemes. Subsequently, the County Council was made a national Centre of Excellence for local transport delivery and looks forward to helping other local authorities raise their delivery performance.

Within the County Council the management processes of the Planning and Transportation Department are broadly defined as Heads of Service / Joint Management Teams reporting to the Executive Management Team (EMT) chaired by the Director of Planning and Transportation. EMT membership includes senior management representation from Mott MacDonald and May Gurney.

Beneath these levels individual groups have their own reporting, such processes including regular meetings of a Capital Programme Review Group and Programme Delivery Team.

To achieve consistency the Planning and Transportation Department operates a Quality Assurance System compliant to ISO 9001:2000; ISO14001:1996.

Project Management concepts follow broadly the principles of the PRINCE methodology, with EMT fulfilling the role of Project Board. The project management process is shown in diagrammatic form in Figure 4.1.

For clarity of ownership each project is assigned a Project Owner who is the person responsible to lead the project from inception through its various phases to completion. The term Project Manager has been reserved for use under the ECC/NEC contract where this title has a specific role.

4.2 Governance and Staffing

Within the Planning and Transportation Department the scheme comes under Head of Technical. The assigned Project Owner is a Chartered Civil Engineer with some 30 years experience of highways improvement schemes and leads a capital programme roads design team. The scheme is being developed by a team made up of design,

construction and environmental specialists from the strategic partnership with Mott MacDonald and May Gurney.

4.3 Risk Management

The earlier section at paragraph 3.6 discusses Risk Uncertainty and Optimism Bias and the Provisional Risk Register is shown in Appendix C.

The register is maintained by the Project Owner. The register sets out a description of risk and assigns a level to that risk based on an Impact/Probability Matrix. Risks are assigned to the Client or Contractor. Actions to manage the risks are set out. The register is a working document and continues to be reviewed and developed through ECI within the Norfolk Strategic Partnership, and has proved to be a useful tool in building up the scheme estimate.

Aside from uncertainties arising from the strategic issues the greatest area of financial uncertainty relates to scheme earthworks and the appropriate geo-technical approach to sub-grade treatment. A financial worst case has been assumed and value engineering possibilities have the potential to generate upwards of £900K of savings.

Whole scheme financial risk is to be contained within a risk allowance of 15% as calculated in Section 3.6.1, and value engineering savings.

4.4 Project Plan and Milestones

Two proposed programmes for the scheme have been developed and are shown on the GANTT charts in Figure 4.2 and 4.3.

The preferred strategy is shown in Figure 4.2. It assumes that a public inquiry will not be necessary and that following a decision on funding in December 2005 works would commence very early in 2006. At the time of writing it is anticipated that the consultation period for the statutory orders will be completed by the end of October 2005. Shortly after this date the County Council will be in a position to advise the DfT whether the Secretary of State has given notice of his intention to hold a public inquiry or not.

The key milestones for the preferred strategy is summarised as follows:

Statutory Procedures

Planning Application	September 2004 (completed)
Determine Planning Application	February 2005 (consent granted)
Defra Licence Application	August 2005
Publish CPO and SRO	August 2005
Secretary of State's decision	November 2005
Orders confirmed	December 2005

Design and Construction through the Norfolk Strategic Partnership:

Detailed design advance works	September 2005 – December 2005
Advance Works	February 2006 – September 2006
Main Construction period	February 2006 – January 2008
Landscape Contract	November 2007 – March 2008

Expenditure Profile

Key to being able to release the full site for the construction of the main works is the completion of two aspects of advance works:

- An archaeological investigation of the Romano-British site at the southern end of the scheme;
- The construction of mitigation ponds to allow the trans-location of small populations of the great crested newt.

The preferred strategy enables elements of construction work concentrated on the northern end of the scheme including the northern junction modification to be carried out in parallel with the essential advance works.

The alternative strategy as shown in Figure 4.3 assumes that a public inquiry will take place and that only essential advance works will be undertaken in 2006/07

As a consequence two expenditure profiles are presented. Table 4.1 shows an expenditure profile on the basis of the preferred strategy. Table 4.2 shows an alternative expenditure profile on the basis that only the essential advance works will be carried out in 2006/07.

	Earlier preparation costs	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	Total £
Fees £	584,145	150,000	567,600	567,600	567,400					2,436,745
Land £	438,198	20,000	400,000	75,000	215,000	1,475,000	600,000	66,802		3,290,000
Works £			8,284,200	9,046,000	402,300					17,732,500
Total £	1,022,343	170,000	9,251,800	9,688,600	1,184,700	1,475,000	600,000	66,802		23,459,245

Table 4.1: Preferred Expenditure Profile (2005 prices)

	Earlier preparation costs	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	Total £
Fees £	584,145	90,000	183,400	526,400	526,500	526,300				2,436,745
Land £	438,198	20,000	20,000	400,000	150,000	200,000	700,000	1,275,000	86,802	3,290,000
Works £			367,000	5,980,600	8,859,200	2,525,700				17,732,500
Total £	1,022,343	110,000	570,400	6,907,000	9,535,700	3,252,000	700,000	1,275,000	86,802	23,459,245

**Table 4.2: Alternative Expenditure Profile (2005 prices)
(Advance works only 2006/07)**

Both the expenditure profiles have been projected forward to forecast future year outturn costs and these are shown in Table 4.3 and 4.4. The projections allow for economy wide inflation of 2.5% on construction costs plus an additional 2.5%. 2.5% economy wide inflation has been assumed for land and fees. Funding for works costs carried out in 2005/06 required as part of the preferred procurement strategy will be met by our contractor strategic partner May Gurney who will be reimbursed from our bid for 2006/07 and therefore this cost is shown in the bid for 2006/07.

	Earlier preparation costs	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	Total £
Fees £	584,145	150,000	581,800	596,300	611,000					2,523,245
Land £	438,198	20,000	410,000	78,800	231,500	1,628,100	678,800	77,500		3,562,898
Works £			8,703,600	9,985,100	466,500					19,155,200
Total £	1,022,343	170,000	9,695,400	10,660,200	1,309,000	1,628,100	678,800	77,500		25,241,343

Table 4.3: Preferred Expenditure Profile (Forecast outturn costs)

	Earlier preparation costs	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	Total £
Fees £	584,145	90,000	188,000	553,000	567,000	580,900				2,563,045
Land £	438,198	20,000	20,500	420,300	161,500	220,800	792,000	1,478,600	103,200	3,655,098
Works £			385,600	6,601,500	10,274,000	3,077,300				20,338,400
Total £	1,022,343	110,000	594,100	7,574,800	11,002,500	3,879,000	792,000	1,478,600	103,200	26,556,543

**Table 4.4: Alternative Expenditure Profile (Forecast outturn costs)
(Advance works only 2006/07)**

4.5 Stakeholder Analysis

The scheme has already been successfully progressed through route options consultation and selection and the planning application processes.

These processes required the identification of a wide range of stakeholders with key and local interests. The consultation processes were mapped out by a consultation plan.

Traffic calming measures are to be introduced along the bypassed section of the A140 through Long Stratton village. It is proposed to implement these measures following opening of the bypass. In order to develop these measures a separate consultation with local stakeholders will be needed. A consultation plan will be developed as appropriate around the time of the start of the substantive bypass works.

4.6 Gateway Review

The 4ps Project Assessment Spreadsheet (PAS) has been used to determine the likely risk of the project. This demonstrates the works to be of 'Routine Risk'. The Risk Assessment scorecard is shown in Table 4.5.

	Maximum Score	Allocated Score
Strategic Context	15	4
Business Impact	61	22
Delivery Capacity	30	7
Technical Factors	42	10
Total	148	43
Risk assessed as:		Routine

Table 4.5: 4ps Project Assessment Summary Scorecard

It is therefore concluded that a full Gateway Review process is not required for this project.

4.7 Evaluation

As a part of the County Council's project management processes a full post-construction and performance review will be carried out utilising customer feedback. The findings will be recorded to form input into future schemes as a part of the Council's drive for continuous improvement.

The project will be monitored in several areas both during and after implementation. Changes in traffic flows and the composition of traffic will continue to be monitored as part of Norfolk County Council's on-going monitoring regime already in place.

A traffic impact study will be undertaken to compare 'before' and 'after' traffic flows on the C497, B1113, C594 and Low Road. This study would be undertaken approximately

6 months after the bypass has opened to traffic and would enable a full assessment of any significant effects to be undertaken.

Accidents will continue to be monitored by Norfolk Constabulary and Norfolk County Council.

Environmental aspects will continue to be monitored by Norfolk County Council's Environment and Waste Group. In addition there will be a comprehensive post construction plan for assessing the effectiveness of protected species mitigation, in particular for the great crested newt.

5.0 Financial

5.1 Alternative Funding Sources

PFI

The nature of the works is that there is little opportunity for post construction revenue streams. In addition, the value of the works is relatively small for a PFI highway scheme. Therefore the project is not considered a suitable candidate for PFI.

Developer Contributions

An analysis of the current and future development plans indicates that there are no development proposals directly or indirectly linked to the proposed Long Stratton Bypass. In view of this there is little opportunity to seek funding contributions from developers.

5.2 Financial Risk

Due to the fact that there are no feasible additional funding streams for the project, the risk associated with funding the project is regarded as low.

5.3 Financial Sustainability

The scheme will provide an additional 4.3 kilometres of highway for Norfolk County Council to maintain. The ongoing costs of day to day and routine maintenance of this extra length of highway is not likely to pose any undue extra burden on the Council. In view of this the project is regarded as financially sustainable.

6.0 Commercial

6.1 Procurement Strategy

It is intended that the Long Stratton Bypass will be procured using the Norfolk County Council Strategic Partnership with Mott MacDonald and May Gurney.

An example of the benefit of this partnership is the fast track completion of Norwich Public Transport Major Scheme which is due to be finished in August 2005 when the new Norwich Bus Station opens. The Norwich Public Transport Major Scheme was granted "provisionally accepted" status in December 2002 and will be fully implemented within 3 years of that date. Much of this has been down to the good partnership working with Mott MacDonald and the project management arrangements. These arrangements comprised a project board with high level representatives from partner agencies like NPS Consultants Ltd and Norwich City Council. Reporting to this Board there have been two main project teams, one for the Bus Priority works and one for the new Bus Station, and underneath these various project teams for the different elements of work.

It is proposed that similar project management arrangements are set up for the delivery of the Long Stratton Bypass but additionally involving the construction partner May Gurney. As a Beacon authority for Rethinking Construction, Early Contractor Involvement with May Gurney during the detailed design phase of the scheme will be used. This will enable the specialist construction skills of the contractor to be incorporated in the scheme at the most advantageous time.

Because the scheme comprises conventional road and bridgeworks through a greenfield site it is unlikely that any significant supply chain issues will arise. However, the Early Contractor Involvement should minimise any supply chain issues.

6.2 Management of Commercial Risk

The involvement to date of the Norfolk County Council Strategic Partnership has already contributed to a greater certainty in the construction cost profiles and in identifying and allocating risk.

The contractual relationship during construction will be based on the ICE ECC using Option C Target Cost.

7.0 Summary and Conclusions

There are particular environmental difficulties caused by the passage of traffic through the village:

- The existing road through the village is substandard in both width and alignment;
- The historic core of Long Stratton along the A140 is designated a conservation area;
- Narrow sections of carriageway and footways give rise to unsatisfactory conditions for pedestrians and cyclists;
- Within the built-up area there are a number of road junctions one of these is signal controlled, and one signal controlled pedestrian crossing. Most of the junctions do not meet current standards for layout and visibility. A 30 mph speed restriction on the A140 through the centre of the village exists between Lime Tree Avenue and St. Michael's Road. 50mph zones extend either side of the 30mph restriction for approximately 700m to the north and 900m to the south;
- The current speed restrictions, signal controlled junction and pedestrian crossing act to slow down traffic within the built up area, creating a pinch point and delays on the route with resultant traffic congestion, noise, pollution and safety issues.

The key scheme objective is to remove/reduce through traffic from the built-up area of Long Stratton.

A scheme is identified for investigation and implementation within the Norfolk County Council Structure Plan Policy T9.

The cost of the scheme, including a risk allowance of 15%, is £22.44 million in 2005 prices.

The economic assessment results in total Present Value of Costs of £19.6 million, total Present Value of Benefits of £77.9 million, Net Present Value of £58.3 million and Benefit to Cost Ratio of 3.980.

Individual environmental impacts of the proposed road have been evaluated. The most significant impacts will be the effects on the following:

- Archaeological remains at the site of the Romano-British settlement and site of Medieval cropmarks;
- Habitat of small meta populations of great crested newts;
- Landscape character in the vicinity of Stratton St. Michael;
- Visual intrusion experienced by Thatched Cottage.

The Appraisal Summary Table indicates that environmental impacts are generally a mixture of adverse and beneficial. There are beneficial safety implications, economic impacts are beneficial, accessibility impacts are moderate positive, and integration impacts are neutral.

It is intended that early contractor involvement is utilised through the Council's Strategic Partnership, in keeping with the principles of Rethinking Construction, for which Norfolk has been awarded Beacon status.

In conclusion, a bypass for Long Stratton will provide significant traffic relief to the village of Long Stratton and bring benefits to the community by reductions in congestion with consequential improvements in local air quality and noise pollution.