A428 Black Cat to Caxton Gibbet improvements

TR010044

Volume 9

9.2 Applicant's Response to the Examining Authority's First Round of Written Questions

Planning Act 2008

Rule 8(1)(b)

The Infrastructure Planning (Examination Procedure) Rules 2010

August 2021

Infrastructure Planning

Planning Act 2008

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(Examination Procedure) Rules 2010

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Development Consent Order 202[ ]

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Regulation Number	Rule 8(1)(b)
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Author	A428 Black Cat to Caxton Gibbet improvements Team and Highways England

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Rev 1	31 August 2021	Final for Deadline 1

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Responses to the Examining Authority's Written Questions

This document has been prepared by the Applicant to set out its responses to the Examining Authority's (ExA's) first round of written questions.

These can be found in **Table 0-1** below.

Table 0-1 Applicant's Response to the Examining Authority's First Round of Written Questions

No.	Directed to	Question
Q1.1	**General and Cross Topic**	
Q1.1.1	**General and Cross Topic**	
Q1.1.1.1	Applicant	**Question**: **Decarbonising Transport** The Government recently published *"Decarbonising Transport"* document in response to the UK's 6th Carbon Budget (2033-2037). What are the implications of *"Decarbonising Transport"* for the Proposed Development, including in terms of the Environmental Impact Assessment?
		Answer: The Applicant's position is that the commitments presented in the Transport Decarbonisation Plan, 'Decarbonising Transport: A better, greener Britain' (TDP)[1] do not have any implications for the Scheme or the conclusions on significance presented in the Environmental Statement. Further, the TDP does not affect the clear need for the Scheme and, the anticipated reduction in carbon emissions arising from the transport network that are considered acceptable even as a highly conservative worst case. The TDP was published in July 2021 in response to the UK's net zero emissions target by 2050. The TDP sets out the government's commitments, and the actions needed, to decarbonise the transport system in the UK by this date. Emissions from the construction of transport infrastructure are not considered in the TDP. The key focus of the TDP is on the impacts from road user emissions. While the TDP identifies that public transport, cycling and walking should be the first choice for those who can take it, it also states that (page 5) *Our ambitious roads programme* '*will continue to reflect that in any imaginable circumstances the clear majority of longer journeys, passenger and freight, will be made by road; and that rural, remote areas will always depend more heavily on roads.'*

[1] Decarbonising Transport – A Better, Greener Britain (publishing.service.gov.uk)

No.	Directed to	Question
		The focus of the TDP is more 'blended' transport, utilising less carbon intense transportation when possible. It states that decarbonising motor transport is a vital part of this plan and sets out a number of targets and commitments to allow this to happen including: • Sales of all new petrol and diesel cars and vans to be phased out by 203. • Sales of new diesel HGVs (less than 26 tonnes) to be phased out by 2035. • Sales of new diesel HGVs (over 26 tonnes) to be phased out by 2040. • An initiative to support the uptake of 4,000 zero emissions buses. The overarching target presented in the TDP is to decarbonise road transport to net zero by 2050. A further aim of the TDP is to tackle road congestion, particularly in urban areas, and a number of solutions are presented including increasing the share of trips taken by public transport, cycling and walking, increasing car occupancy and shifting more freight transportation from road to rail. It should be noted however, that options for improving public transport, cycling and walking were considered and assessed as part of the option identification and option selection stages of the Scheme development. This demonstrated that an alternative mode solution would not contribute to solving the problems experienced on the A428 between the A1 and Caxton Gibbet and at the Black Cat junction. The alternatives therefore would not meet the Scheme objectives. Details of this assessment are presented in the 'Assessment of Alternative Modes' at Appendix Q1.1.1.1. The TDP also recognises the importance of road improvements as part of the solution to reduce congestion. Page 103 of the TDP states: *'Continued high investment in our roads is therefore, and will remain, as necessary as ever to ensure the functioning of the nation and to reduce the congestion which is a major source of carbon.'* *'In the coming years, our ambitious and accelerating plans to decarbonise all road traffic, described elsewhere in this document (the TDP), will transform roads' impact on greenhouse gas emissions.'* GHG emissions from road users presented in the Chapter 14, Climate assessment in the Environmental Statement **[APP-083]** have been calculated using the DMRB calculator, which is based on the Defra Emissions Factors Toolkit (EFT), with the outputs of traffic modelling for the Scheme. The EFT does not currently allow for recent government policy presented in the TDP, including the forecast uptake of electric and low carbon vehicles. The version of the EFT

No.	Directed to	Question
		used for the assessment was published in 2019[2], before publication of the TDP, and therefore no consideration has been given in the model to the road user decarbonisation targets presented in the TDP. The assessment has been undertaken in line with current guidance and presents a worst case scenario for climate impact. Similarly, for noise and air quality, the emission rates used with the assessment of effects of the Scheme presented in the ES do not account for the plans presented in the TDP. As such, future fleet mixes utilised within the assessment will not include the forecast uptake of electric vehicles and therefore the overall effects predicted in the ES are worst case. As no significant effects are predicted for air quality with the current methodology and emission rates, no significant effects would be anticipated with the plans set out in the TDP. On the basis of the forecasts of electric vehicle usage, and the potential magnitude of the difference in overall vehicle noise levels emitted by electric vehicles, the increased uptake of electric vehicles in the future is anticipated to have a small beneficial effect on traffic noise levels where traffic speeds are low. Such effects are not considered to change the overall conclusions of the road traffic noise assessment of the Scheme as reported in the Environmental Statement. Road user GHG emissions from the Scheme are anticipated to reduce in line with the TDP. While it is not possible to calculate the impact of the TDP on the Scheme using the current approach, for reasons explained above, it is possible to estimate the impact of the TDP based on the reduction projections presented in the TDP. Figure 2, page 45 of the TDP provides a projection for the reduction of UK domestic transport emissions from 2019 to 2050 based on the commitments in the plan, presented as a range of emissions reduction over this period. In 2019, emissions from UK transportation are presented as 122.15 MtCO2e. By 2050, it is forecasted that emissions from UK transportation will decrease to somewhere between 0 and 10 MtCO2e per annum. It is assumed that the Scheme's emissions would reduce in line with these reductions.

[2] Emissions Factors Toolkit v9.0. Department for Environment, Food and Rural Affairs (2019)

<table>
<tr><th>No.</th><th>Directed to</th><th>Question</th></tr>
<tr><td></td><td></td><td>Attachments for the response:
<table>
<tr><th>Name</th><th>Link</th><th>Description</th></tr>
<tr><td>Decarbonising Transport: A better, greener Britain</td><td>https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1009448/decarbonising-transport-a-better-greener-britain.pdf</td><td>The UK Government's Transport Decarbonisation Plan</td></tr>
<tr><td>Net Zero Highways: Our 2030 / 2040 / 2050 Plan</td><td>https://highwaysengland.co.uk/netzerohighways/</td><td>Highway's England's pathway to Net Zero in 2050</td></tr>
<tr><td>Emissions Factors Toolkit v9.0</td><td>Emissions Factors Toolkit v9.0. Department for Environment, Food and Rural Affairs (2019)</td><td>Emissions Factors Toolkit that forms the basis of the calculation of the road users greenhouse gas emissions assessment for the Scheme</td></tr>
</table></td></tr>
<tr><td rowspan="2">Q1.1.1.2</td><td rowspan="2">Applicant</td><td>Question:
Accordance with National Networks Policy Statement
To assist all parties in their understanding of the Proposed Development and to signpost parties to relevant sections of the Application, the Applicant may consider it appropriate to provide a summary in tabular form to demonstrate how it is considered the Proposed Development accords with each relevant section of the NPS NN.</td></tr>
<tr><td>Answer:
The Applicant has prepared a National Policy Statement for National Networks Accordance Table. It is Appendix A in the "Case for the Scheme", [APP-240], commencing at page 115 of that document. This signposts to the relevant documents within the Application for each matter addressed in the NPS NN and summarises how the Scheme accords with each relevant section of it.</td></tr>
</table>

No.	Directed to	Question
Q1.1.1.3	Applicant Interested Parties Other Persons	**Question:** **National Planning Policy Framework** Explain giving reasons, if you believe that aspects of the application need to be updated in light of the revised National Planning Policy Framework published on 20 July 2021.
		Answer: The Case for the Scheme **[APP-240]**, in paragraph 5.1.5, explains that the National Planning Policy Framework (NPPF) does not set out the primary policy context or decision-making principles for DCO applications under the Planning Act 2008 (PA 2008). The National Policy Statement for National Networks (NPS NN) acknowledges in paragraph 1.17 that the overall strategic aims of the NPPF and NPS NN are consistent, but the two documents have differing but equally important roles to play. The revised NPPF makes clear that it is the role of the NPS NN to assume the function and provide policy to guide individual development proposals brought under it. The Case for the Scheme **[APP-240]**, in paragraph 5.1.6, goes on to explain that there are instances where the NPS directly references the NPPF and others where the NPPF may provide more detailed and/or more up to date guidance than the NPS. The NPPF can therefore be considered to be an important and relevant consideration in decision making on NSIPs, but only to the extent that it is relevant to the particular project or topic under consideration. The NPPF was updated on 20 July 2021, following a consultation on proposed revisions published in January 2021. The biggest change to the NPPF is that the updated version places greater emphasis on beauty. The revised policy also demonstrates a focus on place-making, the environment, sustainable development and the importance of design codes. The key changes are set out below, together with a commentary on whether the A428 Black Cat to Caxton Gibbet improvements Scheme complies with the changes, and whether any aspects of the Scheme need to be updated, as a result of the recently published updated NPPF. The Applicant has also checked the assessments that have been undertaken as part of the Environmental Impact Assessment to ascertain whether methodologies from the NPPF have been relied upon. We are satisfied that we do not need to make any changes to the assessments as a result of the changes made to the NPPF.

<table>
<tr><th>No.</th><th>Directed to</th><th>Question</th></tr>
<tr><td></td><td></td><td>In conclusion, the Applicant considers that there are no aspects of the Scheme that need to be updated in the light of the recently published updated NPPF.
<table>
<tr><th>Changes Between 2019 NPPF and recently published 2021 NPPF</th><th>Does the Scheme accord with this Change?</th><th>Are any updates to the A428 DCO Application required because of the revision to the NPPF?</th></tr>
<tr><td>Chapter 4. Decision Making
Tailoring Planning Controls to Local Circumstances.
Details within Paragraphs 53 and 54 of the updated NPPF in respect of the use of Article 4 directions to remove national permitted development rights have been expanded slightly.</td><td>This is not relevant to the A428 DCO Application</td><td>NO</td></tr>
<tr><td>Chapter 8 Promoting Healthy and Safe Communities.
2021 NPPF introduces a new paragraph (new Paragraph number 96) which states that local planning authorities should work proactively with public infrastructure providers including further education colleges, hospitals and criminal justice</td><td>Although the new paragraph is not relevant to the A428 DCO Application, it should be noted that the Applicant has undertaken extensive consultation on the development of the Scheme. This is reported in full in the Consultation Report and its appendices [APP-033 to APP-069].</td><td>NO</td></tr>
</table></td></tr>
</table>

No.	Directed to	Question			
		accommodation to resolve key planning issues before applications are submitted.			
		Chapter 9. Promoting Sustainable Transport. Considering Development Proposals. 2021 NPPF introduces a new requirement in paragraph 110, in relation to assessing sites that may be allocated in plans, or specific applications for development. That is (c) the design of streets, parking areas, other transport elements and the content of associated standards reflects current national guidance, including the National Design Guide and the National Model Design Code.	The National Design Guide and National Model Design Codes are for use by local planning authorities as a basis for the production of design codes and guides and in decision making, so are not relevant to Highways England, as Applicant for the Scheme. However, similar principles have been adopted for the design of the Scheme as it follows the guidance set out in the Highways England publication "The Road to Good Design". This document contains a series of principles for good road design which are centred on the themes of connecting people, places and processes. The principles from the Road to Good Design are embedded in the Design Manual for Roads and Bridges (DMRB) which is the standard to which the scheme has been designed. Similar themes of the Road to Good Design and the National Design Guide include: • The importance of context, that is ensuring that road design its	NO	

No.	Directed to	Question			
			sensitive to the landscape, heritage and the local community. • The need to achieve an environmentally sustainable design. • Bringing lasting value. Other principles embedded in the Road to Good Design include the need to make roads safe and useful, the need to make roads inclusive and making roads understandable. It's worth nothing that road design has specific demands of technical design and safety that must be met. Since aesthetic considerations must accept these demands, the potential for variation is more challenging, but still possible for many elements such as signs and lighting for example. Furthermore, the Scheme has been designed in accordance with the Highways England Design Manual for Roads and Bridges (DMRB) and so other design guides and codes, retrospectively fitted to the application are not necessary. Therefore, the Applicant considers that this updated section of the NPPF is not applicable or relevant to the Examination of the Scheme.		

No.	Directed to	Question			
		Chapter 11. Making Effective Use of Land. Achieving Appropriate Densities. 2021 NPPF introduces a new requirement in paragraph 125. This states that area-based character assessments, design guides and codes and masterplans can be used to help ensure that land is used efficiently while also creating beautiful and sustainable places.	As this paragraph falls under the sub-title "Achieving Appropriate Densities", it is not relevant to nationally significant infrastructure projects, including road schemes**.** The term "appropriate densities" means that it applies to housing and other forms of built development.	NO	
		Chapter 12. Achieving Well Designed Places. 2021 NPPF paragraph 127 (last sentence) changes the emphasis from neighbourhood plans to neighbourhood planning groups. It explains that neighbourhood planning groups can play an important role in identifying the special qualities of each area and explaining how this should be reflected in development, both through their own plans and by engaging in the production of design policy, guidance and codes by local planning authorities and developers.	Neighbourhood Plans and their planning groups were consulted in the various pre-application stages for the Scheme. The local planning groups are welcome to participate in the Examination as Interested Parties. Details of consultation are set out in the consultation report this includes extensive Local Authority and Parish Council engagement. No Local Planning groups have been identified and therefore consulted.	NO	

No.	Directed to	Question			
		Chapter 12. Achieving Well Designed Places. 2021 NPPF paragraph 128 requires all local planning authorities to prepare design guides and codes consistent with the principles set out in the National Design Guide and National Model Design Code and which reflect local character and design preferences. Design guides and codes provide a local framework for creating beautiful and distinctive places with a consistent and high quality standard of design. 2021 NPPF Paragraph 129 adds new text explaining that design guides and codes can be prepared at an area-wide, neighbourhood or site specific scale, and, to carry weight in decision making should be produced as part of a plan or as supplementary planning documents. Landowners and developers **may** contribute to these exercises, but **may** also choose to prepare design codes in support for a planning application for sites that they wish to develop. (Emphasis added).	The National Design Guide and National Model Design Codes are for use by local planning authorities as a basis for the production of design codes and guides and in decision making, so are not relevant to Highways England, as the Applicant for the Scheme. Paragraph 129 explains that landowners and developers **may** contribute to design guides and codes in support of a planning application. However, this is not mandatory. The Scheme takes into account the Highways England publication, 'The Road to Good Design' which contains a series of principles for good road design which are centred on the themes of connecting people, places and processes. Furthermore, the Scheme has been designed in accordance with the Highways England Design Manual for Roads and Bridges (DMRB) and so other design guides and codes, retrospectively fitted to the application are not necessary. Therefore, the Applicant considers that this updated section of the NPPF is not applicable or relevant to the Examination of the Scheme.	NO	

No.	Directed to	Question			
		Chapter 12. Achieving Well Designed Places. 2021 NPPF paragraph 131 introduces the requirement for planning policies and decisions to ensure that new streets are tree-lined as trees make an important contribution to the character and quality of urban environments.	This new paragraph specifically addresses new streets in urban environments. The Scheme does not create any "new streets" in urban environments. Notwithstanding this, Chapter 7, Landscape and Visual Effects of the Environmental Statement (ES) **[APP-076]** explains that measures have been incorporated into the Scheme to include a comprehensive landscape strategy including mitigation tree and hedgerow planting.	NO	
		Chapter 12. Achieving Well Designed Places. 2021 NPPF paragraph 134 (replacing the previous NPPF paragraph 130) introduces the requirement for planning authorities to refuse development that is not well designed, especially where it fails to reflect local design policies and government guidance on design. It adds the requirement for significant weight to be given to development which reflects local design policies and government guidance or local design guidance; and outstanding or innovative designs which promote high levels of	The NPS NN in paragraphs 4.28 to 4.35 explain that applicants should include design as an integral consideration from the outset of the proposal. Visual appearance, functionality, fitness for purpose, sustainability and cost should be key factors in considering the design of new infrastructure. Paragraph 4.32 of the NPS NN explains that scheme design will be a material consideration in decision making. The Secretary of State needs to be satisfied that national networks infrastructure projects are sustainable and as aesthetically sensitive, durable, adaptable and resilient as they can reasonably be (having regard to regulatory and other constraints	NO	

No.	Directed to	Question			
		sustainability, or help raise the standard of design more generally in an area, so long as they fit with the overall form and layout of their surroundings.	and including accounting for natural hazards such as flooding. The Case for the Scheme **[APP-240]**, Appendix 8, rows 4.28-4.29, 4.33, 4.34, and 4.35 provides details analysis regarding how the Scheme is in compliance with the NPS NN, in relation to all "good design" matters.		
		Chapter 14. Meeting the challenge of climate change, flooding and coastal change. 2021 NPPF Paragraph 160 changes the previous paragraph 157 to state that opportunities provided by new development and improvements in green and other infrastructure should be used to reduce the causes and impacts of flooding making as much use as possible of natural flood management techniques as part of an integrated approach to flood risk management.	A Flood Risk Assessment **[APP-220]** has been submitted as part of the DCO application for the Scheme. Section 3.4 sets out the approach to design that has been taken in order to mitigate flood risk as a result of the Scheme. This includes careful design of the River Great Ouse viaduct to avoid the placement of piers and foundations within the river itself, the implementation of Sustainable Drainage Systems to manage surface water runoff in order to minimise flood risk and the incorporation of current design standards and climate change allowances. Appendix A of the Case for the Scheme **[APP-240]** (pages A54-A55) sets out how the Scheme has addressed mitigation relating to flood risk. This set out that natural flood management techniques form part of the Drainage Strategy **[APP-219]**	NO	

No.	Directed to	Question			
			which includes ponds, reedbeds and swales.		
		Chapter 15, Conserving and Enhancing the Natural Environment. 2021 NPPF paragraphs 176 and 177 (in relation to development within National Parks, the Broads and Areas of Outstanding Natural Beauty) slightly changes the wording from the previous NPPF paragraph 172, adding "*development within their setting should be sensitively located and designed to minimise adverse impacts upon the designated areas.*"	The Scheme does not fall within any AONBs, National Parks or the Broads, nor within the setting of any of these designated landscape areas. This is confirmed within Chapter 7, Landscape and Visual Effects of the Environmental Statement **[APP-076]**, paragraph 7.6.33.	NO	
		Chapter 16. Conserving and Enhancing the Historic Environment. 2021 NPPF, in a new paragraph (paragraph 198) explains that in considering any applications to remove or alter a historic statue, plaque, memorial or monument (whether listed or not), local planning authorities should have regard to the importance of their retention in situ and, where appropriate, of explaining their	The Scheme would result in the loss of a Grade 2 Listed building – Brook Cottages. However, listed buildings are not included within this new NPPF paragraph. The loss of Brook Cottages and the mitigation proposed is documented in Chapter 6, Cultural Heritage of the Environmental Statement **[APP-075].** Appendix E of the Case for the Scheme **[APP-240]** sets out how greater public benefit can be achieved	NO	

No.	Directed to	Question			
		historic or social context rather than removal.	by relocation of Brook Cottages to a museum. The Scheme requires the recording, removal, storage and reinstatement of three listed milestones. They will be protected during construction and reinstated as close as possible to their original setting, such that their context is retained. Section 12.2 **[APP-238]** of the Archaeological Mitigation Strategy sets out the intended approach.		
Q1.2	**Air Quality**				
Q1.2.1	**Effects on human and ecological receptors**				
Q1.2.1.1	Local Authorities Public Health England	**Question:** **Effects on receptors** ES **[APP-074, paragraphs 5.9.38 – 5.9.40]** states that the Proposed Development would have no significant adverse effects on human health or designated habitats sites during either construction or operational phases of the scheme. Do LAs and PHE agree with this conclusion? Explain with reasons.			
		Answer: No response required from Applicant.			
Q1.2.1.2	Central Bedfordshire Council	**Question:** **Sandy Air Quality Management Area** ES **[APP-074, paragraphs 5.9.12–5.9.13]** states that the magnitude of NO2 change is predicted to be imperceptible at the 7 identified receptors in Sandy.			

No.	Directed to	Question
		a) Does CBC agree with this assessment? If not, explain with reasons. b) Are there other design options or measures that should be considered to improve air quality at this location?
		Answer: No response required from Applicant.
Q1.2.1.3	Applicant	**Question:** **Future vehicle fleet** The ES **[APP-161]** explains that the methodology used by the Applicant to undertake the Air Quality assessment. For clarity, does the methodology followed account for the phasing out of new petrol and diesel vehicles as described in the Government's Road to Zero Strategy, 2018 and Transport Decarbonisation Plan, 2021? If so, how?
		Answer: The air quality assessment set out in the air quality chapter and associated appendices of the Environmental Statement (ES) **[APP-074 and APP-161]** utilises an emissions calculator[1] developed by Highways England to calculate emissions from vehicles in the baseline and opening years. These emissions are then input into the detailed dispersion model Atmospheric Dispersion Modelling System Roads[2] (ADMS-Roads). The outputs of the ADMS-Roads modelling are then processed to provide the pollutant concentrations reported in the air quality chapter and associated results appendices **[APP-162]**. The emissions calculator incorporates the emission rates published by The Department for Environment, Food and Rural Affairs (Defra) in the Emissions Factors Toolkit[3] (EFT). This toolkit is updated periodically to account for emerging evidence on changes to vehicle fleets over time and the anticipated changes to the fleet mix and vehicle technology over time. The fleet composition data comes from information available from the National Atmospheric Emissions Inventory (NAEI), alongside Transport for London for London specific fleets[4]. The Road to Zero Strategy[5] is not referenced in the EFT User Guide and therefore it is considered unlikely this was incorporated in the preparation of the EFT. Consequentially, the air quality assessment does not explicitly use information from the Road to Zero Strategy. The Transport Decarbonisation Plan[6], 2021, was published after completion of the air quality assessment and has therefore not been taken into account within the assessment. Both of these plans include measures to modernise the vehicle fleet, increasing the uptake of electric vehicles over those using petrol or diesel. This will result in lower emissions of oxides of nitrogen (NOx) and associated

No.	Directed to	Question
		concentrations of nitrogen dioxide (NO_2) compared to the emissions and concentrations in Chapter 5, Air Quality assessment **[APP-074]**. If the Road to Zero Strategy and Transport Decarbonisation Plan had been incorporated lower NO_2 concentrations and smaller changes in NO_2 concentrations would have been predicted for the Scheme. Therefore, the air quality assessment of future years within the ES is considered to be conservative and worst case for the Scheme. [1] IAN185-13 Speed Band Emission Factors v2.3 [2] ADMS-Roads version 5.0. Cambridge Environmental Research Consultants Ltd (2020). [3] Emissions Factors Toolkit v9.0. Department for Environment, Food and Rural Affairs (2019). (https://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html) [4] National Atmospheric Emissions Inventory (https://naei.beis.gov.uk/) [5] Department for Transport (2018), The Road to Zero [6] Department for Transport (2021), Decarbonising Transport, A Better Greener Britain
Q1.2.1.4	Applicant Local Authorities Public Health England	**Question:** **Dust control** With specific regard to the control of construction dust, are LAs and PHE satisfied with the measures proposed in the first iteration EMP and the level of detail that will be secured in the dDCO through the First Iteration **EMP [APP-234, Annex A, Tables A-1, A-2, A-3]**.
		Answer: It is noted that this question is primarily aimed at the Local Authorities and Public Health England. However, the Applicant confirms that Highways England considers the level of detail provided to be appropriate for the First Iteration Environmental Management Plan **[APP-234]**, which contains proposed mitigation measures based on those set out in the Institute of Air Quality Management (IAQM) Guidance on the assessment of dust from demolition and construction[1]. [1] Guidance on the assessment of dust from demolition and construction (Version 1.1). Institute of Air Quality Management (2014). http://iaqm.co.uk/text/guidance/construction-dust-2014.pdf
Q1.3	**Biodiversity and Ecological Conservation**	

No.	Directed to	Question
Q1.3.1	**General**	
Q1.3.1.1	Applicant Natural England Environment Agency Local Authorities	**Question:** **Protecting and improving biodiversity** Have all reasonable opportunities for protecting and improving biodiversity been taken, in line with the policy requirements in the NPS NN (paragraphs 5.20-5.38)?
		Answer: Appendix A of the Case for the Scheme **[APP-240]** provides a National Policy Statement for National Networks (NPSNN) Accordance Table. Details regarding the compliance of the Scheme with NPSNN in respect of biodiversity and ecological conservation (paragraphs 5.20 -5.38) are provided in pages A36-A42. It explains, on page A36, that through the design-development process, measures have been identified and incorporated into the Scheme to mitigate and, where necessary compensate (offset) for the loss of habitats and vegetation, some of which provides both a landscape integration and a biodiversity function. Opportunities to conserve, and where reasonably possible, enhance biodiversity are described in Chapter 2, The Scheme **[APP-071]** and Chapter 3, Assessment of Alternatives **[APP-072]** of the Environmental Statement. These present the alternatives considered during the design-development of the Scheme and explain how the final design has sought to avoid sites of ecological importance and minimise land take in pursuit of nature conservation. The Applicant refers the ExA to the table presented in its response to Q1.3.5.1 which presents full details of the losses and gains in habitats and linear features as a result of the Scheme. This table demonstrates that many of the existing habitats and hedgerows that would be lost to the Scheme are species poor, and that the Scheme would result in significant increases in the total lengths of species-rich hedgerows, the area of marsh grassland, neutral grassland and woodland. The Applicant also refers the ExA to Appendix 8.19, Biodiversity Net Gain **[APP-206]** of the Environmental Statement, which demonstrates how the Scheme will deliver a net gain in biodiversity of 20.5%, when compared to existing values.
Q1.3.1.2	Applicant	**Question:** **Objectives of the Proposed Development**

No.	Directed to	Question
		To maintain existing levels of biodiversity is an overarching objective of the Proposed Development, but why is BNG not included, particularly when the scheme would achieve BNG **[APP-071, Section 2.2]**?
		Answer: The Scheme objectives presented in paragraph 2.2.2 of Chapter 2,The Scheme of the Environmental Statement **[APP-071]** were developed in direct response to identifying potential solutions to the problems of congestion, poor journey time reliability and poor resilience against incidents identified between the existing Black Cat and Caxton Gibbet roundabouts. Scheme objective (d) relates to the delivery of environmental improvements, and seeks to "Maintain existing levels of biodiversity…". This particular objective was developed in response to the Applicant's commitment to reducing the loss of biodiversity on the Strategic Road Network by first moving to a position of biodiversity neutrality by the year 2020, and then moving towards achieving Biodiversity Net Gain by 2040 (as set out within the following documents): • Department for Transport: Road Investment Strategy for the 2015/2016 – 2019/2020 Road Period. • Highways England: Delivery Plan 2015-2020. • Highways England: Our plan to protect and increase biodiversity (June 2015). Notwithstanding the objective to achieve neutrality in terms of biodiversity loss, and there also being no requirement within the National Policy Statement for National Networks for transport-related nationally significant infrastructure projects to deliver Biodiversity Net Gain, potential was identified during the Scheme's design-development and consultation phases to deliver biodiversity net gain by virtue of the form and extent of the environmental measures incorporated into the Scheme. Calculations undertaken by the Applicant as part of the assessment reported in Appendix 8.19 of the Environmental Statement **[APP-206]** concluded that a positive Biodiversity Net Gain score of 20.5% would be achieved. Based on this outcome, it was not considered necessary by the Applicant to modify Scheme objective (d) in this regard.
Q1.3.1.3	Applicant	**Question:** **Surveys** The EA makes reference to updating ecological surveys as the scheme progresses **[RR-036]**; NE also refers to

<table>
<tr><th>No.</th><th>Directed to</th><th>Question</th></tr>
<tr><td></td><td></td><td>various updated surveys [RR-076]. Do you intend to undertake any specific updates to ecological surveys to provide up-to-date information as the scheme progresses? If so, which and when; if not, why not?</td></tr>
<tr><td></td><td></td><td>Answer:
The Applicant recognises the need to ensure that the baseline of biodiversity information is:
• Up to date as per criteria in Chartered Institute of Ecology and Environmental Management (CIEEM) guidance (CIEEM, 2019).
• Spatially comprehensive including surveying areas that had not been surveyed previously (for example where land access has not been available).
• Cognisant of any short-term changes e.g. creation of new Badger setts.
• Fit to inform detailed mitigation and enhancement planning.
As a result, certain ecological surveys have been undertaken during 2021, and are proposed over the winter of 2021-22 and for 2022. These are summarised in the table below.
Summary of ecological surveys undertaken and planned (2021 to 2022)
<table>
<tr><th>Biodiversity feature</th><th>Last surveyed</th><th>Recommendation and rationale</th><th>Status 2021</th><th>Status 2022</th></tr>
<tr><td>Biodiversity records held by Local Environmental Records Centres</td><td>2018</td><td>2021: Obtain updated biodiversity records from Bedfordshire and Luton Biodiversity Recording and Monitoring Centre and Cambridgeshire and Peterborough</td><td>Completed</td><td>-</td></tr>
</table></td></tr>
</table>

No.	Directed to	Question				
				Environmental Records Centre		
		Terrestrial habitats including Phase 1 Habitat and arable flora	2018-20	2021: Focussed surveys for habitats last surveyed in 2018 and, or access withheld 2022: Pre-construction survey	Completed	Planned
		Aquatic habitats	2018	2021: Focussed surveys for habitats including those which were dry in 2018 and those for which access withheld 2022: Pre-construction survey	Completed	Planned
		Bats	2018-20	2021: A key biodiversity feature (high bat diversity and activity and rare Barbastelle) for which baseline data need to be kept up to date[1]	Ongoing	Depends on

No.	Directed to	Question				
				2022: Depends on outcome of 2021 surveys		outcome of 2021 surveys
		Badger	2018-19	2022: Pre-construction survey	-	Planned
		Otter and Water Vole	2018-19	2022: Pre-construction survey	-	Planned
		Other mammals	2019 (review of existing data only)	2021: Undertake a review of up to date publicly available data including records from LERCs (see above) and recently published natural history society journals and proceedings to be undertaken	Completed	-
		Breeding birds	2018, 2020 (partial)	2021: Undertake a review of up to date publicly available data including county bird reports 2022: Need to survey areas previously not	Ongoing	Planned

No.	Directed to	Question

		surveyed and maintain validity of baseline data (only partial survey in 2020)		
Wintering birds	2019-20	2021-22: Pre-construction survey	-	Planned (over winter)
Hobby	2019-20	2022: Pre-construction survey	-	Planned
Red Kite	2019-20	2022: Pre-construction survey	-	Planned
Barn Owl	2017-19	2021: Focussed on trees identified in previous surveys 2022: Depends on outcome of 2021 survey	Completed	Depends on outcome of 2021 survey
Reptiles	2018	2021: Re-survey of habitat suitability 2022: Pre-construction survey	Completed	Planned
Great Crested Newt	2018-19	2021: A key biodiversity feature for which data are needed to ensure comprehensive and	Completed	

No.	Directed to	Question

		up to date database to inform licence application including waterbodies not visited 2022: Resurvey of all ponds within 500 m of the Scheme boundary		Planned
Fish	2019	None required as data are sufficiently up to date	-	-
Terrestrial invertebrates	2019	None required as data are sufficiently up to date	-	-
Aquatic invertebrates	2018-20	None required as data are sufficiently up to date	-	-
Invasive non-native plants	2016-20	2022: Pre-construction survey to inform checking and amending Invasive Species Management Plan	-	Planned

No.	Directed to	Question
		[1] These ongoing bat surveys do not include any additional investigations of Barbastelle bats and associated surveys. The scope of further Barbastelle bat surveys has been discussed and agreed, subject to appropriate consents being obtained, with Natural England, as set out in the Eversden and Wimpole Woods SAC Technical Note **[TR010044/EXAM/9.13]** and the Joint Position Statement on Habitats Regulations Assessment and Mitigation **[TR010044/EXAM/9.14]**, submitted at Deadline 1.
Q1.3.2	**Biodiversity Net Gain (BNG)**	
Q1.3.2.1	Applicant Natural England	**Question:** **Metric for calculating BNG** The Applicant has calculated that the Proposed Development would deliver 20.5% BNG using the HE metric. The BNG is primarily due to the creation of new woodland and grassland habitats, together with the creation of wetland habitats, and restoration works to sections of watercourses [**APP-077**, paragraph 8.10]. a) Applicant, what would the BNG score be using the DEFRA 2.0 metric? b) NE, in your RR you have stated that DEFRA 2.0 is your preferred metric because it considers habitat condition and other key criteria **[RR-076, paragraph 2.12.9]**. Provide further explanation. c) The ExA is aware of the more recent NE Biodiversity Metric 3.0. In light of this, can NE confirm that DEFRA 2.0 metric is still the preferred metric to calculate the BNG on the Proposed Development, or update your position? d) NE and Applicant, explain the differences between the three Metrics in temporal, qualitative and quantitative terms, and how the measure of BNG would change?
		Answer: **a)** The Applicant can confirm that it is currently evaluating the biodiversity net gain score that would be achieved by the Scheme based on the Defra Metric 2.0 method. A report detailing the outcomes of these revised calculations will be prepared by the Applicant and submitted to the Examination on or before Deadline 3. **d)**

No.	Directed to	Question
		The Applicant has reviewed the three metrics in temporal, qualitative and quantitative terms. Table 1 in Appendix Q1.3.2.1 provides a summary of the key differences between the Highways England Metric, Biodiversity Metric 2.0 and Biodiversity Metric 3.0.
Q1.3.3	**Hedgerows**	
Q1.3.3.1	Applicant	**Question:** **Clarification on net loss** a) A net loss of hedgerows within the Order Limits is shown in Table 8-9, but a net gain in Table 8-10 – which is it **[APP-077]**? b) Provide clarification on any other related inconsistencies in the ES.
		Answer: a) The Applicant can confirm that the statement presented in Table 8-10 of Chapter 8, Biodiversity **[APP-077]** of the Environmental Statement is correct in that the total length of hedgerows that would be created as part of the Scheme would be greater in comparison to the lengths of hedgerow that would be lost, representing an overall increase in hedgerow length. The hedgerow data within Table 8-9 of Chapter 8, Biodiversity **[APP-077]** of the Environmental Statement is erroneous and incorrectly presented. The Applicant can confirm that the five table rows containing hedgerow information within Table 8-9 (referenced as J2.1, J2.1, J2.2, J2.3 & J2.3) should have been presented as per the corrected table rows below. Based on these corrected values, this represents an increase of 4.3 km of hedgerow which reflects the statement contained in Table 8-10. **Hedgerow lengths pre- and post-construction**

Hedgerow type	Pre-construction (baseline) (km)	Post-construction (km)

No.	Directed to	Question

J2.1.1 Species rich intact hedge	2.73	19.30
J2.1.2 Species poor intact hedge	5.71	0.84
J2.2.1 Species rich defunct hedge	0.06	0
J2.2.2 Species poor defunct hedge	1.03	0.22
J2.3.1 Species rich hedge with trees	1.39	0.03
J2.3.2 Species poor hedge with trees	5.92	0.75
Total	16.84	21.14

b) With regards to related inconsistencies, the Applicant has reviewed the above correction against the following documents which make reference – either quantitatively or qualitatively – to hedgerow losses and gains, in order to determine whether further corrections are required and to verify the accuracy of related statements and data:

- Chapter 7, Landscape and Visual Effects **[APP-076].**
- Chapter 8, Biodiversity **[APP-077]**.
- Appendix 8.3 Terrestrial Habitats including Hedgerows **[APP-190].**
- Appendix 8.19 Biodiversity Net Gain **[APP-206].**

No.	Directed to	Question
		The Applicant can confirm that a number of tables in section 3 of Appendix 8.19 Biodiversity Net Gain **[APP-206]** also contain incorrect information relating to hedgerow losses and creation. As stated by the Applicant in its response to Q1.3.2.1, a revised biodiversity net gain is currently being undertaken in line with the Defra Metric 2.0 methodology. The Applicant accordingly proposes to address these inconsistencies as part of that revised calculation, which will be submitted to the Examination on or before Deadline 3. No further corrections are required to these documents, and no further inconsistencies have been identified within the above documents.
Q1.3.4	**European Designated Sites**	
Q1.3.4.1	Natural England	**Question:** **Ouse Washes SPA, SAC and Ramsar site and Portholme SAC** The RR from NE [RR-076, paragraph 3.5.1] states that the NSER **[APP-233]** demonstrates beyond reasonable scientific doubt that the Proposed Development will not have an adverse effect on the integrity of the Ouse Washes SAC, SPA and Ramsar site and Portholme SAC. a) Can NE confirm that it is content that the measures incorporated within the Proposed Development to mitigate for pollution events and polluted surface water runoff are not necessary for a negative screening, and, that the intervening distance and natural dilution and settlement rates are sufficient on their own to conclude no likely significant effect on the relevant European Sites listed above?
		Answer: No response required from Applicant.
Q1.3.4.2	Applicant Natural England	**Question:** **Eversden and Wimpole Woods SAC** NE does not consider there is sufficient information available in the NSER **[APP-233]** to rule out likely significant effects with regard to the Eversden and Wimpole Woods SAC Barbastelle bat population **[RR-076, paragraph 3.5.1]**.

No.	Directed to	Question
		a) Applicant, are you intending to undertake the assessments and bat surveys requested by NE? When will these be completed, and submitted to the Examination? b) NE, in the absence of information on the home range of the maternity colonies, main foraging area and flight lines as well as the seasonal changes in habitat use in the SAC Barbastelle bat population, can sufficient mitigation measures be proposed to conclude that the Proposed Development will not adversely affect the integrity of the site?
		Answer: a) The Applicant notes Natural England's views and position regarding the Habitats Regulations Assessment: No Significant Effects Report **[APP-233]** submitted as part of the Development Consent Order application, and its request for further surveys and assessments to be undertaken to further evidence and support the Applicant's conclusion that the Scheme is not likely to result in significant effects on the qualifying interest (Barbastelle bat) of Eversden and Wimpole Woods Special Area of Conservation (SAC). The Applicant held a workshop with Natural England on 23 August 2021 to discuss the survey data collected and relied upon within its assessment, how the conclusion of no likely significant effects on the SAC has been arrived at, and the feasibility of undertaking further bat surveys between now and the end of the Examination. Following the workshop, the Applicant shared its proposed scope for further bat surveys with Natural England on 24 August 2021. This includes a combination of habitat suitability inspections and crossing point surveys at locations along the Scheme, and advanced licence bat survey techniques (ALBST) to trap and tag Barbastelle bats within Eversden and Wimpole Woods SAC. The Applicant made Natural England aware of the fact that the proposed surveys would need to be constrained to a period between September – December 2021 as time would be needed to secure the necessary land access and licences, and to enable the Applicant to then collate the findings of the surveys and submit a report to the Examination at Deadline 7. Post the workshop on 24 August, the Applicant engaged in e-mail correspondence with Natural England (see Eversden and Wimpole Woods SAC Technical Note **[TR010044/EXAM/9.13]**). Following a review of Natural England's recommendations, the Applicant discussed these surveys with Natural England to agree the survey scope and identify the licence applications required to carry out ALBST surveys within the SAC. The current position between the Applicant and Natural England is presented in the Joint Position Statement on Habitats Regulations Assessment and Mitigation **[TR010044/EXAM/9.14]** submitted at Deadline 1.

No.	Directed to	Question
Q1.3.4.3	Applicant Natural England Local Authorities	**Additional Question:** **Eversden and Wimpole Woods SAC** a) Can the Applicant provide any evidence of recent tracking or surveys of Barbastelle Bats from the Eversden and Wimpole Woods SAC that they have undertaken? b) Can the Applicant, NE and relevant LAs provide any evidence to support the assertion that the Eversden and Wimpole Woods SAC is functionally linked to other identified Barbastelle Bat roosts in the area? Please describe the functional linkages.
		Answer: a) As noted by Mr Gleave in the Issue Specific Hearing held on 18 August 2021, the Applicant has not undertaken tracking or other forms of surveys of Barbastelle bats from within Eversden and Wimpole Woods SAC. The reasons for not undertaking surveys within the SAC are presented in Eversden and Wimpole Woods SAC Technical Note **[TR010044/EXAM/9.13]**, which the Applicant has submitted to the ExA at Deadline 1. b) The Applicant refers the ExA to: • The Habitats Regulations Assessment: No Significant Effects Report **[APP-233]**. • Eversden and Wimpole Woods SAC Technical Note **[TR010044/EXAM/9.13],** which provide objective evidence that substantiates the Applicant's view that no functional linkages exist between Eversden and Wimpole Woods SAC and Barbastelle bat roosts within, or immediately surrounding, the Scheme's Order Limits.
Q1.3.5	**Habitat Fragmentation**	
Q1.3.5.1	Applicant Natural England Local Authorities	**Question:** **Adequacy of mitigation measures** The Proposed Development includes a four-lane highway, three grade separated junctions and associated works; the existing A428 would be retained and de-trunked. Roads are barriers to the movement of various terrestrial and aquatic species, and the scheme

No.	Directed to	Question
		proposes various measures, such as underpasses and culverts, to mitigate this, which are partially referenced in the Schedule of Mitigation **[APP-235, Table 4].** Habitat creation and restoration are also proposed. a) NE and LAs, with reference to the habitats to be lost and gained in the area **[APP-077, Table 8-9]**, is the provision of certain types of habitat particularly important to biodiversity in this area, and if so which types? b) With reference to the habitats to be lost and gained in the area **[APP-077, Table 8-9]**, would there be an increase or reduction of such habitats as a result of the proposed mitigation? c) NE and LAs, Would the design, number and location of underpasses and culverts be sufficient to prevent aquatic and terrestrial habitat fragmentation? d) Applicant, why are only some of these measures referenced in the Schedule of Mitigation **[APP-235]**, and then only in limited terms (e.g. mammal ledges)? e) NE and LAs, would the size and locations of the proposed habitats be sufficient to create or link to existing functional habitats and so support biodiversity?
		Answer: b) The Applicant refers the ExA to its response to Q1.3.3.1, which identifies a correction to the hedgerow lengths presented in Table 8-9 within Chapter 8, Biodiversity **[APP-077]** of the Environmental Statement. The Applicant has reproduced Table 8-9 below, with its corrections, to demonstrate how areas and lengths of habitats and hedgerows will alter as a result of the Scheme, including percentage changes. For clarity, a positive percentage change represents an increase in the habitat area or length of hedgerows over the baseline, whilst a negative percentage represents a reduction. **Changes in extent of habitat pre-and post-construction**

Phase 1 Habitat Survey category	Area/length before works (ha/km)	Area/length after works (ha/km)	Percentage change (%)

No.	Directed to	Question

A1.1.1 Woodland- Broadleaved- Semi-natural	2.69 ha	0	-100
A1.1.2 Woodland - Broadleaved - Plantation	0.93 ha	60.60 ha	+6,416
A1.2.2 Woodland - Coniferous - Plantation	0.20 ha	0	-100
A1.3.2 Woodland - Mixed - Plantation	0.60 ha	1.82 ha	+203
B2.2 Neutral grassland - Semi-improved	5.41 ha	139.34 ha	+2,476
B4 Improved grassland	24.16 ha	38.13 ha	+58
B5 Marsh/ marshy grassland	0	2.90 ha	+100
B6 Poor Semi-improved grassland	10.42 ha	0.57 ha	-95
J1 Cultivated/disturbed land	276.52ha	8.85 ha	-97
J2.1.2 Species poor intact hedge	5.71 km	0.84 km	-85
J2.2.2 Species poor defunct hedge	1.03 km	0.22 km	-79
J2.3.2 Species poor hedge with trees	5.92 km	0.75 km	-87
J2.1.1 Species rich intact hedge	2.73 km	19.30 km	+607
J2.3.1 Species rich hedge with trees	1.39 km	0.03 km	-98

No.	Directed to	Question
		<table><tr><td>J2.2.1 Species rich defunct hedge</td><td>0.06 km</td><td>0</td><td>-100</td></tr></table> d) The Applicant can confirm that the purpose of the Schedule of Mitigation **[APP-235]** is to function as a summary document to signpost the reader to where detailed information relating to the embedded, essential and enhancement measures is reported within the Environmental Statement. For example: measure EMB – B10 within the Schedule of Mitigation **[APP-235]** comprises an action involving "*The creation of a network of wetland habitats, including ephemeral wetland habitat, reedbeds and wet grassland within the Scheme.*". The locations and extents of these wetland habitats are not detailed within the document because these details are presented illustratively within the Environmental Masterplan **[APP- 091]**. Accordingly, full descriptive details of each individual measure are not included or considered necessary within the Schedule of Mitigation **[APP-235]**. The Applicant is unclear regarding the ExA's query "why are only some of these measures referenced in the Schedule of Mitigation..." as the Applicant believes that the measures summarised within the Schedule of Mitigation **[APP-235]** reflect those set out and relied upon within the Section 8.8 (Design, mitigation and enhancement measures) of Chapter 8, Biodiversity assessment **[APP-077]**. Further clarification would be welcomed. The Applicant will then respond by the next deadline.
Q1.3.6	**Aquatic Environment and Biodiversity**	
Q1.3.6.1	Environment Agency	**Question:** **Mitigation measures** a) How should the various measures identified under Biodiversity, in the appendix to your RR **[RR-036]**, be addressed by the Proposed Development, such as by updating the dDCO or through the EMP iterations? b) When should works to watercourses be restricted to support fish spawning times?
		This question of the question is not for the Applicant to respond to. The Applicant will provide any response to the points raised at Deadline 3.

No.	Directed to	Question
Q1.3.7	**Arboreal Environment**	
Q1.3.7.1	The Woodland Trust	**Question:** **Arboreal Environment** a) With reference to the application documents, identify all veteran trees and groups, ancient woodland and protected trees that you are concerned about relative to the Proposed Development **[APP-183]**–**[APP-187]**. b) In your RR **[RR-111]**, why has specific reference been made to trees at Reference G61, instead of to others of seemingly, at least comparable value **[APP-183]**–**[APP-187]**?
		Answer: No response required from Applicant.
Q1.4	**Climate Change and Carbon Emissions**	
Q1.4.1	**Emissions**	
Q1.4.1.1	Applicant	**Question:** **Emissions** The Applicant considers that the impacts of the Proposed Development, in the context of overall UK emissions, would not materially affect the UK Government meeting its legally binding carbon reduction targets **[APP-083, paragraphs 14.9.17–14.9.28]**. a) What is the cumulative effect of the Road Investment Strategy 2 (RIS2) schemes in terms of Greenhouse Gas (GHG) emissions? b) What is / would be the cumulative impact of the various Road Investment Strategies on UK Carbon budgets? c) What consideration has been given to the likely future operational emissions over the lifetime of the Proposed Development? d) What is the likely effect of the Proposed Development on the 6th Carbon budget (2033-2037) and on future carbon budgets up to 2050?

No.	Directed to	Question
		e) Have all reasonable opportunities to limit carbon emissions during construction and operation been taken?
		Answer: a) The applicant has satisfied the consideration of cumulative effects under the EIA Regulations. The cumulative effects of the Scheme are inherently captured within the GHG assessment methodology set out in Chapter 14, Climate **[APP-083]** of the Environmental Statement. This is because emissions from various sources embedded within the construction of the Scheme are considered as well as, and additional to, emissions from the operation of the Scheme (as set out as Table 14-7 of Chapter 14, Climate **[APP-083])** as net emissions to the atmosphere to show the total impact on each carbon budget. The consideration of the cumulative effects of the Scheme with other existing and/or approved projects is inherent within the methodology followed through the inclusion of the Scheme and other locally committed developments within the traffic model summarised in the Transport Assessment **[APP-241]** and as described in paragraph 15.3.21 of Chapter 15, Assessment of cumulative effects **[APP-084]** of the Environmental Statement. Additionally, the emissions from the Scheme are considered against the national context of continuing economic activity through the comparison with the UK carbon budgets, which consider sectors across the economy. Chapter 14 Climate of the ES [APP-083] demonstrates that the Scheme would only contribute 0.125%, 0.11%, 0.024% to the 4th, 5th and 6th budgets, respectively, and were therefore deemed unlikely to affect the ability of the Government to meet its carbon reduction plans. Were the Scheme to have a material effect (which it does not), it would be because, acting together with the other economic activity factored into a carbon budget, the target budget would be made significantly harder to achieve. b) Chapter 14, Climate **[APP-083]** of the Environmental Statement presents the quantification and assessment of construction and operational GHG emissions in line with the requirements of NPSNN (para 5.17). GHG emissions from the Scheme have been assessed against the 3rd, 4th, 5th and 6th carbon budget periods. The Case for the Scheme **[APP-240]**, Appendix A, provides the Applicant's NPSNN Accordance Table, row 5.17 of which provides a summary explaining how the Scheme is in compliance with NPSNN paragraph 5.17. The consideration of cumulative impacts across the RIS is a matter for DfT. c) The operational GHG emissions have been calculated across the 60-year lifetime of the Scheme. The calculation includes emissions relating to: operation of the associated road lighting, periodic maintenance of the road, and additional road user emissions on the associated affected road network. Defra's Emission Factors Toolkit was used to calculate the GHG emissions from traffic on the associated affected road network. This includes a conservative uptake assumption of 30% EVs by 2030 and no further future increase. It is accepted that

<table>
<tr><th>No.</th><th>Directed to</th><th>Question</th></tr>
<tr><td></td><td></td><td>technological advances and changes further to the assumptions above are likely to beneficially contribute to reducing GHG emissions in the future. The outcomes of the calculation have been compared to the UK Government Carbon Budget period in which they arise. Further information on the methodology and outcomes is presented within Chapter 14, Climate [APP-083] of the Environmental Statement, sections 14.3, 14.7 and 14.9.

d) The 6th carbon budget was not legally binding when the Environmental Statement was written however an additional assessment of GHG emissions against the 6th Carbon Budget, which became legally binding during June 2021, has been undertaken. As stated in paragraph 14.9.28 of Chapter 14, Climate [APP-083] of the Environmental Statement, the Scheme represents less than 0.024% of the total emissions in the 6th budget period and is therefore not considered to have a material impact on the UK Government meeting its carbon reductions target. The table below presents carbon emissions from the Scheme arising during each carbon budget period.

<table>
<tr><th>Carbon Budget</th><th>3rd (2018 to 2022)</th><th>4th (2023 to 2027)</th><th>5th (2028 to 2032)</th><th>6th (2032 to 2037)</th><th>Period beyond current legislated carbon budgets to 2050</th></tr>
<tr><td>Construction (tCO2e)</td><td>52,090</td><td>156,280</td><td>0</td><td></td><td></td></tr>
<tr><td>Operation (tCO2e)</td><td>0</td><td>73,570</td><td>201,520</td><td>226,637</td><td>651,558</td></tr>
<tr><td>Total (tCO2e)</td><td>52,090</td><td>229,850</td><td>201,520</td><td>226,637</td><td>651,558</td></tr>
</table>
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No.	Directed to	Question
		Carbon budgets have not been produced from 2038 to 2050 and it is not appropriate to speculate what these will be. As and when subsequent carbon budgets are produced, these will have to take account of committed development and that will be a matter for DfT. e) Chapter 14, Climate **[APP-083]** of the Environmental Statement presents a range of measures to mitigate GHG emissions from the construction and operation of the Scheme. This Scheme has sought to minimise GHG emissions in all cases to contribute to the UK's target for net reduction in carbon emissions. This is a requirement that Highways England places on its suppliers through DMRB LA 114 Climate. The way this is delivered is through application and development of the following options: 1) avoid / prevent: a) maximise potential for re-using and/or refurbishing existing assets to reduce the extent of new construction required, and/or explore alternative lower carbon options to deliver the project objectives (i.e. shorter route options with smaller construction footprints); b) identify through projects and delivery programmes opportunities to influence user GHG emissions; 2) reduce: apply low carbon and/or reduced resource consumption solutions (including technologies, materials and products) to minimise resource consumption during the construction, operation, and at end of life; 3) remediate: identify, assess and integrate measures to further reduce carbon through on or off-site offsetting or sequestration. The opportunities identified to limit carbon emissions during construction and operation were considered reasonable at the time of the assessment as the Scheme was at the Preliminary Design Stage. As the Scheme progresses, contractors are appointed and designs are finalised, there may be further opportunities for savings to be implemented. For example, via future iterations of the Environmental Management Plan **[APP-234]**.
Q1.4.1.2	Transport Action Network Interested Parties	**Question:** **Emissions** A number of Interested Parties make reference to the Proposed Development increasing carbon emissions by over 3 million tonnes, and to being the third worst scheme in the RIS2 such as **[RR-116]**. a) Provide evidence to support your claims of GHG emissions for the proposed scheme, including relative to other RIS2 schemes. b) What sources of GHGs are considered to be missing from the applicant's approach? c) What would be the implications of the scheme on carbon emissions given the ban on the sale of new petrol and

<table>
<tr><th>No.</th><th>Directed to</th><th>Question</th></tr>
<tr><td></td><td></td><td>diesel vehicles from 2030 and the expected increased future use of electric or non-GHG emitting vehicles in the future?</td></tr>
<tr><td></td><td></td><td>Answer:
a) Chapter 14, Climate [APP-083] of the Environmental Statement presents an assessment of the Scheme against the UK Government's current carbon budgets, as required by Paragraph 5.17 of the NPSNN[3]: "for road project applicants should provide evidence of the carbon impact of the project and an assessment against the Government's carbon budgets". Paragraph 5.18 of the NPSNN clarifies that "any increase in carbon emissions is not a reason to refuse development consent, unless the increase in carbon emissions resulting from the proposed scheme are so significant that it would have a material impact on the ability of Government to meet its carbon reduction targets". The assessment within Chapter 14, Climate [APP-083] has identified that the emissions arising as a result of the Scheme represent less than 0.012% of the total emissions in any of the 3rd, 4th or 5th Carbon Budget periods. Accordingly, the assessment has concluded that the GHG emissions impact of the Scheme would not have a material impact on the UK Government meeting its legally binding carbon reduction targets. Although the 6th Carbon Budget was not legally binding when the Environmental Statement was written, an additional assessment of the 6th Carbon Budget, which became legally binding during June 2021, has been undertaken. The Scheme represents less than 0.024% of the total emissions in the 6th budget period and is also considered not have a material impact on the UK Government meeting its carbon reductions target.

Chapter 14, Climate [APP-083] of the Environmental Statement also presents a comparison of construction emissions against other Schemes proposed in RIS 2. A summary of the projects included in this comparison is presented in the table below.
<table>
<tr><th>Scheme</th><th>Construction emissions (tCO2e/km)</th></tr>
<tr><td>A428 Black cat</td><td>11,600</td></tr>
<tr><td>A46 Coventry Junctions</td><td>19.090</td></tr>
</table>
</td></tr>
</table>

[3]National Policy Statement for National Networks ttps://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/387222/npsnn-print.pdf

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M54-M6 Link Road	23,400
A303 Amesbury to Berwick Down	35,900
M42 Junction 6	25,390

b) Chapter 14, Climate **[APP-083]** presents GHG emissions from the construction and operation of the Scheme in line with the requirements of DMRB LA114 Climate and the method set out in the Environmental Statement. The assessment has been undertaken using industry recognised carbon calculation tools. Highways England's carbon emissions tool was used to calculate emissions from the construction and maintenance of the Scheme (https://www.gov.uk/government/publications/carbon-tool). Emissions from road users have been calculated in line with WebTag guidance using the Defra Carbon Emissions Toolkit.

GHG emissions presented were calculated in line PAS2080 (2016) Carbon Management in Infrastructure which provides Best Practice guidance for calculating lifecycle emissions for infrastructure schemes. In certain circumstances it is permissible to exclude emissions sources where they are not material to the overall footprint. Additionally, emissions sources can be excluded where it is not practical to gather data. On this basis emissions from scheme end of life were excluded. As the Scheme would likely be still operating beyond the 60-year design life, end of life would occur outside of the reasonable assessment period. It is therefore not possible state when the Scheme would be decommissioned or the methods used.

Other exclusions due to data not being available have included maintenance transport, and replacement of road signage, traffic markings and road studs. These are not considered to be materials to the overall Scheme emissions footprint.

c) Road user emissions presented in Chapter 14, Climate **[APP-083]** of the Environmental Statement with relation to road user emissions are considered to be conservative due to the calculation method used. Road user emissions are calculated using traffic data sets published and applied by Defra in their Emission Factor Toolkit (EFT). This includes a conservative uptake assumption of 30% EVs by 2030 and no further future increase, which does not factor in the impact of current government policy presented in the Transport Decarbonisation Plan[4] published in

[4] https://www.gov.uk/government/publications/transport-decarbonisation-plan

No.	Directed to	Question

July 2021 including the uptake of electric and low carbon vehicles. As the current EFT only provides traffic models to 2030, no consideration has been given in the model beyond this to include the government ban on the sale of new petrol and diesel cars and vans from 2030, the ban on HGVs (less than 26 tonnes) by 2035, the ban on diesel HGVs (over 26 tonnes) beyond 2040 or the target to decarbonise road transport by 2050.

While it is therefore not possible to calculate the impact of government transport decarbonisation policy on the impact of the Scheme using the current assessment method until Defra have updated the EFT, the table below provides an estimate of potential impacts based on the transport decarbonisation projections in the Transport Decarbonisation Plan.

The Transport Decarbonisation Plan presents UK domestic GHG emissions from transport in 2019 as 122.15MtCO2e and uses this as a baseline against which future decarbonisation is modelled (TDP, Page 15). Of this total the following contributions are made by road transport: cars and taxis (67.7MtCO2e, 55.4%), heavy goods vehicles (19.5MtCO2e, 19.5%), light duty vehicles (19.2MtCO2e, 15.7%), buses and coaches (3.1MtCO2e, 2.5%), motorcycles and mopeds (0.5MtCO2e, 0.4%) and other road use (0.7MtCO2e, 0.6%). Emissions from road users equate to just over 90% of total domestic transport emissions with the remainder predominantly coming from rail, domestic shipping and domestic aviation.

Figure 2, page 45 of the Transport Decarbonisation Plan provides a projection for the reduction of UK domestic transport emissions from 2019 to 2050 based on the commitments in the plan. Figure 2 presents this as a range of emissions reduction over this period.

Using figure 2 it is possible to calculate the minimum and maximum projected percentage GHG reduction for ten yearly intervals between 2030 to 2050 against the 2019 baseline. This percentage reduction has then been applied to emissions from the Scheme over the same period to understand the potential impact on estimated emissions from the Scheme under the TDP commitments.

	A428 annual GHG emissions based on the climate assessment (tCO2e)	A428 annual GHG emissions when considering maximum estimated impact of TDP reduction projections (tCO2e)	A428 annual GHG emissions when considering minimum estimated impact of TDP reduction projections (tCO2e)

<table>
<tr><th>No.</th><th>Directed to</th><th>Question</th></tr>
<tr><td></td><td></td><td>
<table>
<tr><td>2030</td><td>40,303</td><td>16,524</td><td>29,824</td></tr>
<tr><td>2040</td><td>50,352</td><td>4,028</td><td>15,609</td></tr>
<tr><td>2050</td><td>50,352</td><td>0</td><td>4,028</td></tr>
</table>
By 2050 it is estimated that GHG emissions from the Scheme will have reduced to between 0 and 4,028MtCO2e as a result of government policy impacts. Any residual emissions at this time would require to be offset in line with the UK's net zero target.
</td></tr>
<tr><td rowspan="2">Q1.4.1.3</td><td rowspan="2">Applicant</td><td>
Additional Question:
Sixth carbon budget
Applicant to provide additional information on:
a) The Proposed Development's compliance with the sixth carbon budget as set out in the Carbon Budget Order 2021, including an update to the assessment of the impact of the Proposed Development on the carbon budgets as set out in the ES Chapter 14 [APP-083] to take account of the sixth carbon budget including for the design year (2041); and
b) Building on the ES Chapter 14 [APP-083], the direct, indirect and cumulative likely significant effects of the Proposed Development with other existing and/ or approved projects on climate, including greenhouse gas emissions and climate change adaptation; which should be set in light of the requirements set out in the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 and in light of paragraphs 5.17 and 5.18 of the NPS NN.
(See related question in General and Cross-topic)
</td></tr>
<tr><td>
Answer:
<u>Part A</u>
A summary of the UK government carbon budgets relevant to the scheme is provided below in Table 2-1 (in line with paragraph 14.9.18 of the Environmental Statement) Chapter 14, Climate [APP-083], with the addition of information regarding the 6th carbon budget.
</td></tr>
</table>

<table>
<tr><th>No.</th><th>Directed to</th><th>Question</th></tr>
<tr><td></td><td></td><td>
Table 2-1 Summary of relevant carbon budgets
<table>
<tr><th>Carbon Budget</th><th>Carbon Budget Level</th><th>Reduction Below 1990 Levels</th></tr>
<tr><td>3rd carbon budget (2018 to 2022)</td><td>2,544 $MtCO_2e$[1]</td><td>37% by 2023</td></tr>
<tr><td>4th carbon budget (2023 to 2027)</td><td>1,950 $MtCO_2e$</td><td>51% by 2025</td></tr>
<tr><td>5th carbon budget (2028 to 2032)</td><td>1,725 $MtCO_2e$</td><td>57% by 2030</td></tr>
<tr><td>6th carbon budget (2033 to 2037)</td><td>965 $MtCO_2e$</td><td>78% by 2035</td></tr>
</table>
An assessment of scheme greenhouse gas (GHG) emissions against the UK government carbon budgets has been undertaken covering the GHG emissions that are projected to occur across the relevant carbon budget periods up to and including the 6th Carbon Budget. The existing Environmental Statement considered the 3rd, 4th and 5th Carbon Budgets (see paragraphs 14.9.17 – 14.9.28 of the Environmental Statement in Chapter 14, Climate [APP-083]). During the completion of the Environmental Statement, a 6th Carbon Budget was recommended at 194 $MtCO_2e$, but as it was a recommendation only it was excluded from the significance testing presented in Chapter 14, Climate [APP-083]. Since completion of the Environmental Statement, the 6th Carbon budget has been revised and has been legislated, which has now been incorporated in Table 2-1 and Table 2-2 of this response.

Table 2-2 sets out the proposed Scheme's GHG emissions aligned to the relevant carbon budget periods, including the 6th Carbon Budget. This summarises the GHG emissions for the proposed Scheme, including emissions from construction and operation (the latter including road user, operational energy use and maintenance emissions, see paragraph 14.9.23 of the Environmental Statement).

Table 2-2 compares the carbon impact of the 'Do Minimum' option of not building the Scheme with the 'Do Something' option of building the Scheme. The comparison of the two scenarios provides the net emissions from construction and operation across each carbon budget period.
</td></tr>
</table>

No.	Directed to	Question

Table 2-2 Scheme GHG emissions in 5-year periods aligned with relevant carbon budgets (developed from Table 14.11 in the Environmental Statement)

Project Stage	Estimated total GHG emissions over relevant carbon budgets (tCO_2e) (DS Scenario)	Net GHG emissions over relevant carbon budgets (tCO_2e) (DS-DM)	Scheme GHG emissions per relevant carbon budget (tCO_2e)			
			3rd (2018 to 2022)	4th (2023 to 2027)	5th (2028 to 2032)	6th (2033 to 2037)
Construction	0	0	52,100	156,300	N/A	N/A
Operation	97,096,700	537,000	N/A	73,600	201,500	226,600
Total	97,096,700	537,000	52,100	229,900	201,500	226,600

Based on the table above, the Scheme has been assessed as contributing 0.024% to the 6th carbon budget reporting period (2033-2037).

It should be noted that this assessment is conservative. Given current policy commitments, described below, it is considered to be an overestimate as the uptake of new electric vehicles in future years would be expected to be higher than the proportions used in the national projections included in Defra's Emissions Factor Toolkit used for the scheme assessment. Within the Emissions Factor Toolkit account is not taken for the increase of electric vehicles beyond 2030.

.Furthermore, the recent publication of both the DfT's Transport Decarbonisation Plan[1] and Highways England's net zero plan[2] are likely to further reduce carbon emissions.

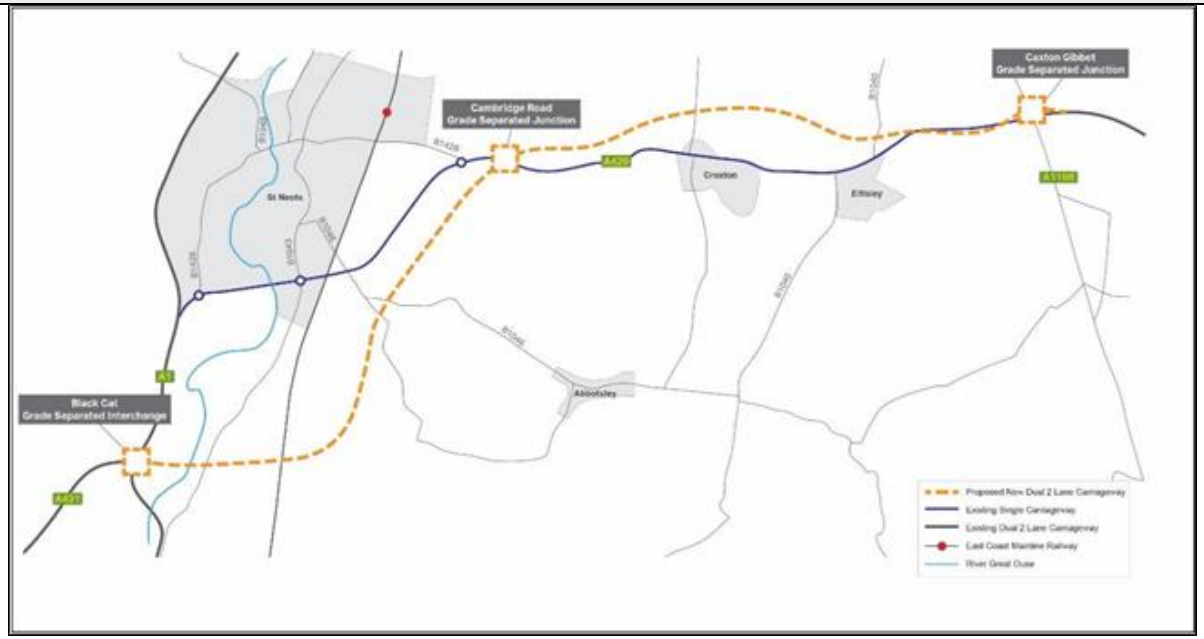
The DfT's Transport Decarbonisation Plan was published in July 2021. The plan outlines a number of commitments by the government to remove all emissions from road transport to achieve net zero target by 2050. Commitments that will have a direct impact on road user emissions from the Scheme will include:

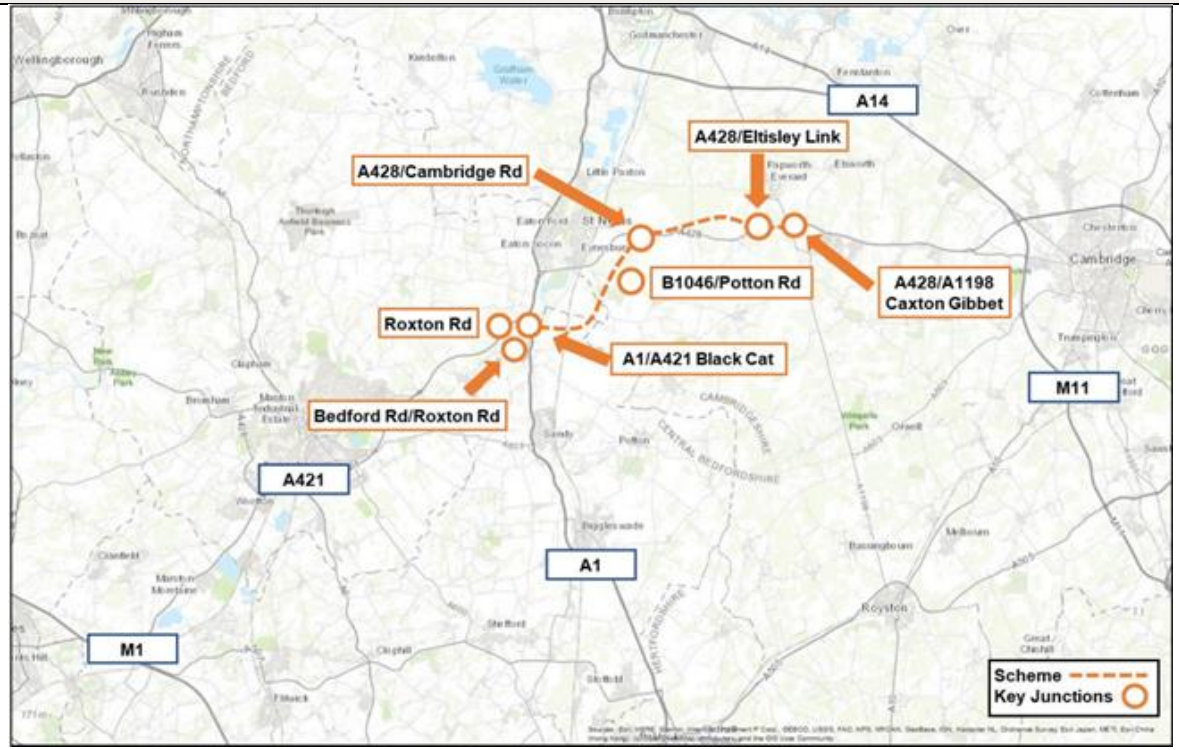
- An end to the sale of new petrol and diesel cars and vans by 2030.

No.	Directed to	Question
		• All new cars and vans to zero emissions at the tailpipe by 2035. • All new L-category vehicles to be fully zero emissions at the tailpipe by 2035. • The end of the sale of all non-zero emissions HGVs by 2040. In addition, the Government is providing support for at least 4,000 zero emission buses and has committed to holding a consultation on a date to end the sale of new non-zero emissions motorbikes. **Summary and Conclusion** The contribution of GHG emissions resulting from the Scheme is assessed as a maximum of 0.024% during the 6th carbon budget period. Highways England therefore does not consider carbon emissions resulting from the Scheme to have a material effect on the government's ability to comply with the carbon budgets. **Part B** To support this response the following terms have been interpreted as follows: • Direct emissions - direct emissions to the atmosphere from relevant activities (e.g., tailpipe emissions from road users or construction vehicles). • Indirect emissions - indirect emissions resulting from the purchase of electricity (e.g., for infrastructure operation) and/or any relevant downstream act ivities bythird parties within the supply chain (e.g., embedded carbon from the manufacturing of construction products such as concrete). • Cumulative effects of the Scheme - The consideration of the GHG emissions impact of the Scheme with other relevant committed developments included within the traffic model for the Scheme. • Likely significant effect - An increase in carbon emissions resulting from a proposed scheme that are so significant that the Scheme would have a material impact on the ability of Government to meet its carbon reduction targets (as per paragraphs 5.17 and 5.18 of the NN NPS). The response to Part B is provided in two parts. The first part relates to the effects on climate, i.e., the GHG aspect of the question and the second part relates to climate vulnerability, i.e., the climate change adaptation aspect.

		Part 1 ***Direct, Indirect and Cumulative effects of the scheme – GHG emissions*** Direct emissions are presented in Section 14.5 of Chapter 14, Climate in the Environmental Statement **[APP-083]** for the proposed Scheme. Indirect emissions encompass the accumulation of embedded emissions that occur throughout the construction supply chain (i.e., an accumulation of various emissions sources such as raw material extraction, intra-manufacturing transportation, manufacturing processes etc). These are also considered as part of the quantification of construction emissions in the Environmental Statement. The consideration of the cumulative effects of the Scheme with other existing and/or approved projects is inherent within the methodology followed in the Environmental Statement through the inclusion of the Scheme and other locally committed developments within the traffic model (see Chapter 5, Air Quality of the Environmental Statement **[APP-074]**, Chapter 15, Assessment of Cumulative Effects of the Environmental Statement **[APP-084]**, and the Transport Assessment Report **[APP-241** and **APP-242]**). UK Carbon Budgets, used to put emissions from the Scheme into context, are inherently cumulative as they consider emissions across all sectors of the economy. **Part 1 – Summary and Conclusion** As explained above, t cumulative emissions are taken into consideration both during the calculation of construction emissions and through the traffic model used as the basis for calculating road user emissions. Accordingly, Highways England do not consider that GHG emissions on account of this scheme alone, including on a cumulative basis, is likely to have any significant effect on climate or the UK's ability to comply with its carbon budgets. As a result, the increase in GHG emissions associated with the Scheme is not a reason to refuse development consent. The increase would have no material impact on the ability of Government to meet its carbon reduction targets and so the proposed development does not give rise to any conflict with paragraph 5.18 of the NPSNN. **Part 2** ***Cumulative likely effects of the scheme with other existing and/or approved projects – climate adaptation*** Direct and indirect climate vulnerability effects are already included within the climate change resilience (CCR) assessment provided within the Environmental Statement. The CCR assessment has included all infrastructure and assets associated with the Scheme and has assessed resilience against both gradual climate change and the risks associated with an increased frequency of extreme weather events, referencing UKCP18 data[1] (details of the climate resilience data is presented in Appendix 14.1 of the Environmental Statement **TR010044/APP/6.3**). Direct effects of

No.	Directed to	Question
		climate change are those identified through the UKCP18 data review, such as heatwave events. The indirect effects are presented as hazards that occur in combination with the direct effect, such as overheated electrical equipment in the example of heatwave events. In addition, as part of the in-combination climate change impact (ICCI) assessment, the combined impacts of future climate change and those associated with the Scheme were considered as a cumulative assessment within the Scheme. The Scheme's Environmental Statement found that none of the potential impacts (during construction or operation) identified in section 14.7 of the Environmental Statement would be significant, and are therefore classed as non-significant (details of the assessment can be found in Table 14.12 of the Environmental Statement. This conclusion is based on the embedded and essential mitigation measures outlined in Section 14.8 of the Environmental Statement and the EMP **[TR010044/APP/6.8]**. The ICCI assessment has not identified the potential for significant combined impacts of future climate change and the Scheme on identified receptors in the surrounding environment (details of the assessment can be found in Table 14.13 of the Environmental Statement). To supplement the assessment made in the environmental statement, which already includes direct, indirect and cumulative effects, an additional assessment is made here to consider whether other strategic transport infrastructure beyond the boundary of the Scheme, which may when subject to climate impacts, have consequences that exacerbate likely significant effects as measured using the consequence and likelihood criteria described at Tables 14.1 and 14.2 in the Environmental Statement. **Study Area** Given the Scheme's importance to regional transport, cumulative climate vulnerability effects are considered at both local and regional scales. The main transport networks at these scales are shown in Figure B.1, Figure B.2 and Figure B.3 in the Appendix and are described in further detail in the below paragraphs Figure 1 shows that alternate road routes around the Scheme are primarily provided by A and B roads, including the A1198, B1046 and B1040.

No.	Directed to	Question
		 **Figure 1. Primary Routes surrounding the A428 Black Cat to Caxton Gibbet (as per Figure 1-2 in the Transport Assessment Report** It is important to note however that compared to other schemes, there are relatively less alternative and direct routes[1]. The routes that are available would provide some local resilience in the event of climate vulnerability impacts in the area. Figure 2 puts the Scheme in a regional context. It shows that: • Traffic traveling from the south of the Scheme (from London for example) towards Cambridge (or vice versa) can interchangeably use the A1, M1 and M11 (as well as a number of A roads) for long distance journeys. • Traffic traveling from the west of the Scheme (from Northampton for example) towards Cambridge (or vice versa) could interchangeably use a number of A roads, including the A14, A421 and A428, as well as the M6 and M40.

No.	Directed to	Question
		 **Figure 2. Regional view of Scheme and generalisation of main routes surrounding it (as per Figure 1-1 in the Transport Assessment Report).** All of the above mentioned regional alternate routes are interconnected by other A roads providing some flexibility at an unforeseen point of traffic disruption that caused re-routing. The rail transport network is presented in Figure 3.

No.	Directed to	Question
		 **Figure 3. Regional Rail Transport** Figure 3. shows that: • Main line routes from London, Stansted Airport, and the Midlands pass through the study area around St Neots and Cambridge.

No.	Directed to	Question
		• Rail traffic can divert east around the study area through Norwich via Ipswich and Birmingham. • Rail traffic can divert west around the study area through Leicester. ***Potential cumulative climate vulnerability effects*** The Scheme will improve transport resilience by providing additional capacity on the A428, by keeping the right traffic on the right roads by separating local traffic from long-distance and commuter traffic, and by better connecting the communities of Bedford, St Neots, Cambridge and Cambourne. Assets (including new road links, junctions and bridges) being replaced or improved on the Scheme will also be designed so they are more resilient to climate change compared to the existing infrastructure assets. Further details on the climate change mitigation that is embedded into the Scheme design can be found in paragraph 14.8.5 of Chapter 14, Climate of the Environmental Statement **[APP-083]**. For example, with regards to flood risk and anticipated climate change, the Scheme has been designed to all relevant standards (see Chapter 13, Road Drainage and the Water Environment of the Environmental Statement **[APP-082]**). Were significant climate vulnerability events to occur and affect one or more strategic routes it is likely that the number of journey options available, coupled with the level of mitigation embedded in the design of this scheme and the rail network (as demonstrated through, for example, the regional weather resilience and climate adaptation plan for the rail network[2]) would provide a sufficient level of systemic resilience to avoid a significant effect when considered against the criteria for significance in the Environmental Statement (which is aligned with the methodology in LA114 in DMRB). ***Part 2 – Summary and Conclusion*** Cumulative effects have been considered in the CCR and ICCI assessments. Both assessments have concluded that there would be no significant cumulative climate vulnerability effects associated with the Scheme. Cumulative effects have also been considered in the additional assessment of the combined effects on transport infrastructure presented in this report. This assessment demonstrates that the Scheme will improve the resilience of the SRN to the effects of climate change. **Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 – National Policy Statement for National Networks** As to compliance with the Infrastructure Planning (Environmental Impact Assessment Regulations) 2017 (as amended) (the EIA Regulations), the Scheme constitutes EIA development for the purposes of those regulations. The Scheme is therefore subject to the environmental impact assessment process provided for at regulation 5 of the EIA

No.	Directed to	Question
		Regulations, which includes the preparation of an environmental statement. An environmental statement was duly prepared and was submitted with Highways England's application for development consent. Paragraph 5 of Schedule 4 of the EIA Regulations provides that the environmental statement must, among other matters, include a description of: "(e) the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources; (f) the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change;" The NNPS, at 5.17 states that "*Where the development is subject to EIA, any Environmental Statement will need to describe an assessment of any likely significant climate factors in accordance with the requirements in the EIA Directive*" and "*It is very unlikely that the impact of a road project will, in isolation, affect the ability of Government to meet its carbon reduction plan targets. However, for road projects applicants should provide evidence of the carbon impact of the project and an assessment against the Government's carbon budgets"*. 5.18 states *"…any increase in carbon emissions is not a reason to refuse development consent, unless the increase in carbon emissions resulting from the proposed scheme are so significant that it would have a material impact on the ability of Government to meet its carbon reduction targets"*. In relation to paragraphs 5.17 and 5.18 of the NNNPS, this response, together with the information provided in Chapter 14, Climate of the Environmental Statement **[APP-083]** , demonstrates that the Scheme will not materially affect the ability of the Government to meet its carbon budgets. Accordingly, the increase in carbon emissions that may arise in consequence of the Scheme is not a reason to refuse development consent pursuant to paragraph 5.18 of the NNNPS. [1] Highways England, 2021: A428 Black Cat to Caxton Gibbet improvements - About the scheme - Highways England [2] Network Rail, Route Weather Resilience Plans 2019-2024: Climate change adaptation - Network Rail [1] UK Climate Impacts Programme (UKCIP) (2018) UK Climate Projections 2018 [1] Decarbonising Transport – A Better, Greener Britain (publishing.service.gov.uk) [2] net-zero-highways-our-2030-2040-2050-plan.pdf (highwaysengland.co.uk) [1] Million tonnes of Carbon Dioxide equivalent

No.	Directed to	Question
Q1.4.2	**Climate Change Adaptation**	
Q1.4.2.1	Applicant	**Question:** **Resilience** Are you satisfied that the Proposed Development is sufficiently resilient to climate change adaptation, in line with NPS NN (paragraphs 4.36-4.47)? Explain with reasons.
		Answer: Chapter 14, Climate **[APP – 083]** of the Environmental Statement contains the assessment undertaken to satisfy the requirements of NPS NN (paragraphs 4.36-4.47). The Proposed Development is considered by this assessment to be sufficiently resilient to climate change, as explained in the following paragraphs. The UK Climate Projections 2018 (UKCP18) high emissions scenario has been used against the 2080 projections at the 50% probability level to assess the impacts of climate change to the Scheme construction and operation, in accordance with NPS NN paragraphs 4.41 and 4.42. The assessment has identified that climate resilience impacts and effects on the Scheme during the construction phase are not expected to be significant, due to the duration and nature of the construction activities associated with the Scheme. The frequency and severity of impacts from climate change are predicted to increase over long-term timeframes (2080s), however, the construction period is in the near future and shorter in duration. The assessment of operational impacts and effects has considered the likelihood of climate events and hazards occurring, and the consequence of the potential impacts on disruption on the road network throughout the 60 year operational lifetime, taking into account of the identified embedded and essential mitigation measures. The findings of the assessment have concluded that no significant effects would occur to the Scheme in respect of climate change, in accordance with NPS NN paragraph 4.43. Mitigation, adaptation measures and consequential impacts are set out in Chapter 14, Climate **[APP – 083]** of the Environmental Statement as appropriate to the Scheme, in accordance with NPS NN paragraphs 4.42- to 4.47, and include: Embedded mitigation: a) The incorporation of Sustainable Drainage Systems (SuDS) to handle road runoff and provide resilience against potential future flood events associated with climate change; b) The specification and installation of highway equipment capable of withstanding high temperatures (including electrical equipment comprising information and communication systems, bridge joints and paved surfaces) arising from severe weather events to provide resilience to climate change; and c) Implementation of emergency systems and response plans,

No.	Directed to	Question
		including the identification of suitable network redundancies and diversion routes, to respond to severe weather events, would further increase the resilience of the Scheme to extreme weather conditions. Essential mitigation to be implemented by the contractor: the identification, selection and use of construction materials with superior properties that offer increased tolerance of fluctuating temperatures associated with climate change. At the time of the Scheme watercourse assessments the Environment Agency (EA) website guidance for river flows indicated that a 35% Higher Central allowance and 65% Upper allowance is required for the Anglian River Basin District. These allowances were used for both the River Great Ouse and 1D/ 2D modelled ordinary watercourses, as indicated within the Flood Risk Assessments **[APP-221] [APP- 222]** and **[APP-025]**. Current EA website river flow guidance shows that the river flow Climate Change Assessment for this district is now lower at 30% and 58% for the respective Higher Central and Upper allowances. Scheme watercourse climate change assessments are therefore also considered sufficiently resilient in line with NPS NN. The drainage strategy in Appendix 13.3 of the Environmental Statement [APP-219] has been designed in accordance with DMRB CG 501 Design of highway drainage systems, ensuring no surcharge for a 1 in 1 year return period and no flooding in a 1 in 5 year return period. The network has been designed including a 40% increase in rainfall intensity to consider the effects of climate change, as requested by the Lead Local Flood Authorities (LLFAs). The Case for the Scheme **[APP-240]**, Appendix A, row 4.44 explains how the Scheme has been designed, as far as possible, to reduce the effects on climate and provide climate change resilience through option identification, appraisal, selection and refinement. This also summarises some of the measures, other than those above that have been incorporated into the Scheme and addresses the NPS NN paragraphs 4.38 to 4.40. The Applicant is satisfied that through the assessment undertaken and the proposed mitigation measures, the Scheme is sufficiently resilient to climate change in line with the requirements of the NPS NN.
Q1.5	**Compulsory Acquisition and Temporary Possession**	
Q1.5.1	**Compulsory Acquisition schedule**	
Q1.5.1.1	Applicant	**Question:** **Compulsory Acquisition schedule** Complete the Compulsory Acquisition Objections Schedule found in Annex A.

<table>
<tr><th>No.</th><th>Directed to</th><th>Question</th></tr>
<tr><td></td><td></td><td>Answer:
The Applicant has submitted the first version of the Compulsory Acquisition Objections Schedule, please refer to Document ref TR010044/EXAM/9.4.</td></tr>
<tr><td>Q1.5.2</td><td colspan="2">Protective Provisions</td></tr>
<tr><td>Q1.5.2.1</td><td>Applicant</td><td>Question:
Protective Provisions
The BoR [APP-032] includes a number of Statutory Undertakers with interests in land.
a) Provide a progress report on negotiations with each of the Statutory Undertakers listed in the BoR, with an estimate of the timescale for securing agreement from them.
b) State whether there are any envisaged impediments to the securing of such agreements.
c) Provide a list of additional Statutory Undertakers have been identified since the submission of the BoR, and answer the above two questions, for the additional Statutory Undertakers</td></tr>
<tr><td></td><td></td><td>Answer:
a) and b) The Applicant has prepared the Statutory Undertakers - Progress Table which has been submitted at Deadline 1 [TR010044/EXAM/9.17]. Currently, there are no envisaged impediments to securing agreement with Statutory Undertakers.
c) There have been no additional Statutory Undertakers identified since the submission of the Book of Reference [APP-032].
Attachments for the response:
<table>
<tr><th>Name</th><th>Link</th><th>Description</th></tr>
<tr><td>Statutory Undertakers – Progress Table</td><td>https://teams.microsoft.com/l/file/A64F37D6-E17E-4289-B657-</td><td></td></tr>
</table>
</td></tr>
</table>

No.	Directed to	Question
		8B3BF383EFCC?tenantId=70b6b8a3-c1f2-433c-aa07-c096bad5bc8b&fileType=docx&objectUrl=https%3A%2F%2Fa428blackcat.sharepoint.com%2Fsites%2FVolume9-ExaminationSubmissionDocuments%2FShared%20Documents%2FGeneral%2FDeadline%201%2F9.17%20Statutory%20Undertakers%20-%20Progress%20Schedule%2FStatutory%20Undertakers%20-%20Progress%20Schedule.DOCX&baseUrl=https%3A%2F%2Fa428blackcat.sharepoint.com%2Fsites%2FVolume9-ExaminationSubmissionDocuments&serviceName=teams&threadId=19:53ykumEBE7pl11qQWq3ODEhbWwrYAkj3wBGA6qkjCqs1@thread.tacv2&groupId=ab606f9f-5b11-45e7-b79b-2e5f8800dc0f
Q1.5.2.2	Bedford Borough Council	**Question:** **Access to land for development** a) In addition to your RR **[RR-008b]** as landowner, provide a plan of the land marked for development and indicative access requirements. Also highlight the "landlock effect" resulting from the utility diversions and construction works. b) Provide your suggested covenants or management agreements for the 12 hectares of land identified for

No.	Directed to	Question
		permanent acquisition for flood compensation.
		Answer: No response required from Applicant.
Q1.5.2.3	Applicant	**Question:** **Changes to CA and TP** National Farmers Union **[RR-074]** and Bedford Borough Council **[RR-008b]**, have expressed concerns that areas identified for CA and TP are excessive. a) Does the Applicant believe that the land identified for CA and TP can be further rationalised or reduced? Explain with reasons. b) If so, provide a timetable of how these changes could be reasonably accommodated within this Examination. State the Applicant's intentions. c) If not, would the Applicant like to provide any further justification (in addition to the responses to the relevant representations) to the Statement of Reasons and annexes **[APP-030]**?
		Answer: a) The Applicant is confident that the land identified for Compulsory Acquisition (CA) and Temporary Possession (TP) cannot be further rationalised or reduced. The Applicant is content that the land included within the Order is no more than is reasonably necessary to deliver the Scheme and is proportional to the proposed works. Further justification for the land and rights in land that are sought through the Order can be found in the Statement of Reasons **[APP-030],** Annex A. b) Not Applicable. c) The Applicant has responded to the two representations identified in this question through the Response to Relevant Representations document submitted at Deadline 1. There is also detailed information provided in Annex A to the Statement of Reasons **[APP-030]** justifying the inclusion of each plot of land. However, should any further clarity be sought on the inclusion of any particular plot, the Applicant would be happy to provide this.
Q1.6	**Construction methods and effects**	

No.	Directed to	Question
Q1.6.1	**Approach to construction and proposed programme**	
Q1.6.1.1	Applicant	**Question:** **Approach to construction** The ES states that construction will take place in six stages. Should tie-in works and detrunking be included in the stages of construction and in the construction programme. Explain with reasons.
		Answer: The main construction works have been programmed in 6 Sections as described in the Environmental Statement (ES) Chapter 2, The Scheme **[APP-071]** paragraph 2.6.4. Each of these sections includes the construction of new carriageways and in Section 1 various sections of temporary carriageway that will connect into either the Strategic or Local Road network. The tie in of each of these carriageways forms part of the works included in the road construction activities in the construction programme for each section. De-trunking is a process to change the status of roads. There are no significant works specifically associated with the de-trunking on this scheme. In the preparation for de-trunking there may be some minor works identified during the detailed design to alter some road signs or road marking and any such works will form part of the activities already shown in the construction programme for each section.
Q1.6.1.2	Applicant	**Question:** **Construction programme** a) Update the construction programme in the ES, if required [**APP-071**, Section 2.6]. b) What confidence is there that the length of the construction programme will not be exceeded? c) What are the principal risks of delay and what contingencies have been included? d) What allowances for variations in the construction programme have been included in the assessments? Please provide references. e) What is the potential for a longer construction programme to give rise to any materially new or materially worse adverse environmental effects in comparison with those assessed in the ES?

No.	Directed to	Question
		Answer: a) The Applicant can confirm that the current construction programme reflects the dates shown in Table 2-3 in Chapter 2, The Scheme of the Environmental Statement **[APP-071]**, and that no update is required. b) The Applicant can confirm that the construction programme presented in Table 2-3 in Chapter 2, The Scheme of the Environmental Statement **[APP-071]** includes a time risk allowance (contingency), as would typically be expected in a construction programme developed at the preliminary design stage. c) As noted in part b), the construction programme presented in Table 2-3 in Chapter 2, The Scheme of the Environmental Statement **[APP-071]** includes a time risk allowance (contingency); however, the key risk to the programme relates to any potential delay that could arise in relation to the Secretary of State determining the Development Consent Order application. No specific contingency has been allowed for this potential delay. d) The Applicant can confirm that the construction programme presented within Table 2-3 in Chapter 2, The Scheme of the Environmental Statement **[APP-071]** represents the worst-case timeline for each phase of Scheme construction. The timescales identified for each phase include time risk allowance (contingency) periods within them to allow for possible delays and extensions to the works – for example in the event of adverse weather conditions being encountered. As stated in paragraph 2.6.13 of Chapter 2, The Scheme of the Environmental Statement **[APP-071]**, the construction programme assumes all works would commence after consent of the Development Consent Order application is granted, and the Environmental Impact Assessment has accordingly been undertaken assuming this worst-case scenario. Paragraph 2.6.20 of Chapter 2, The Scheme of the Environmental Statement **[APP-071]** explains that, at the time of preparing the Development Consent Order application, the Applicant had prepared and submitted separate planning applications for archaeological works within the advanced works phases of the worst-case construction programme, in order to bring the project timeline back to its original milestone dates and thereby shorten the overall construction duration. e) As noted in its response to part d), the Applicant's worst-case construction programme contains time risk allowance (contingency) periods for potential delays and therefore the Applicant can confirm that the Environmental Impact Assessment has taken account of potential delays to the overall construction period.

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		As separate planning applications for certain activities within the Advanced Works and Enabling Works phases have been submitted to the relevant local authorities, with some now consented and being implemented on site, the Applicant expects that the timescales allocated to both phases are likely to reduce in duration. In light of these reductions, the Applicant considers it unlikely that potential exists for the overall duration of the construction period to extend beyond that set out in its worst-case construction programme. Accordingly, no materially new or materially worse adverse environmental effects over those reported within the Environmental Statement are therefore expected to occur as a result of Scheme construction, as all construction works are expected to remain within the overall construction period assessed within the Environmental Impact Assessment.
Q1.6.2	**Borrow pits, construction compounds, waste management**	
Q1.6.2.1	Bedford Borough Council	**Question:** **Borrow pits** BBC, you have expressed concerns about the level of detail about the borrow pits, how they will be worked and restored, and about the first iteration EMP [RR-008a]. What further detail do you think should be provided for Examination, and secured in the dDCO?
		Answer: No response required from Applicant.
Q1.6.2.2	Applicant Local Authorities	**Question:** **Construction compounds** Should the maximum heights for any hoarding that may be required be secured in the Construction compound management plan, and the dDCO **[APP-234, Annex K]**.
		Answer: The Applicant can confirm that construction assessments undertaken as part of Chapter 7, Landscape and Visual Effects assessment **[APP-076]** and Chapter 11, Noise and Vibration assessment **[APP-080]** have not taken account of potential hoarding required around the construction compounds. This is because the requirement for such

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		containment (including its locations and height) will be a matter for agreement with the relevant local authorities in advance of installation, as set out in paragraph 1.6.2 of the Construction Compound Management Plan contained in the First Iteration Environmental Management Plan **[APP-234]**. Although these assessments have assumed a worst-case scenario of no containment of the construction compounds, temporary hoarding (or fencing) may be applied by the Principal Contractor where required. Such proposals for the use of hoarding to visually and acoustically contain these sites would be developed at the detailed design stage, and would be implemented during the construction works phase. Accordingly, to allow sufficient flexibility to maximise the effectiveness of containment where deemed necessary, the Applicant does not believe that maximum heights for hoarding should be set out within the Construction Compound Management Plan contained in the First Iteration Environmental Management Plan **[APP-234]**, or in the dDCO **[APP-025]**.
Q1.6.3	**Environmental Management Plan**	
Q1.6.3.1	Applicant Local Authorities	**Question:** **Pre-commencement works plan** a) Pre-commencement works plan is a certified document in Schedule 10 of the dDCO **[APP-025]**. When will this be submitted to Examination? If this is to be prepared on a later date, can you submit a draft or outline for consideration in the Examination? b) Have local authorities seen a draft or outline of the pre-commencement works plan?
		Answer: a) The only reference to the 'Pre-commencement works plan' is contained within Schedule 2 (Requirements), Part 1 (Requirements), paragraph 1 in the list of definitions of the dDCO **[APP-025]**. This document is not referred to in Schedule 10 within the list of documents to be certified, the Requirements or elsewhere in the dDCO. This definition will be deleted from the list of definitions in Part 1 of Schedule 2 to the dDCO **[APP-025]** as it has been included in error. This correction will be reflected in the updated dDCO submitted at Deadline 1. Any mitigation required for pre-commencement works is secured through the Archaeological Mitigation Strategy **[APP-238]** and the Biodiversity Pre-Commencement Plan **[APP-239]**. For further detail please refer to the Applicant's response to Q1.7.2.1 below.

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		b) As this definition was included in error, no additional plan will be prepared and as such no plan has been shared with the local authorities.
Q1.6.3.2	National Farmers Union	**Question:** **Clarity of content in Relevant Representation** The NFU RR **[RR-074]** refers to various matters, referencing the dDCO and First Iteration EMP. For clarity please explain what is meant by an ''*ALO*" and where in either of the two documents, or wider application such a role is referred to. If this was in error please confirm which of the named roles in the First Iteration EMP those comments relate to.
		Answer: No response required from Applicant.
Q1.6.3.3	Applicant Local Authorities	**Question:** **Roles and responsibilities** Provide a list of roles that are named in the EMP, CTMP or any other certified document, that would specifically be appointed for mitigating the effects of the Proposed Development. Provide a brief description of duties and reporting lines. Refer to related questions in *Draft Development Consent Order*.
		Answer: <u>Outline Construction Traffic Management Plan</u> The Roles named in the Outline Construction Traffic Management Plan (OCTMP) **[APP-244]** are as follows: 1. Role - Traffic Safety and Control Officer (TSCO): • Manage the review and update of the Traffic Management Plan during the construction phase to ensure it remains current and all traffic management arrangements are safe. • Survey and check the suitability of all diversion routes prior to their implementation.

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		• Communicate all road closure information with stakeholders including Local Highway Authorities, Emergency Services and local stakeholders. The TSCO will report to the Principal Contractors Project Manager who will in turn report to the Project Director. 2. Role - The Appointed Traffic Management Contractor: • Will be responsible for implementing and maintaining the planned traffic management across the project. • Will integrate within the Highways England project delivery community, attending workshops and advising on programme and works and booking the required roadspace allocation. The Appointed Traffic Management Contractor will report to the (TSCO). <u>First Iteration Environmental Management Plan</u> Section 2.1 of the First Iteration Environmental Management Plan **[APP-234]** details the roles and responsibilities included within the plan. 1. These roles are set out in Table 2-1 of the First Iteration EMP and include: Role - The Principal Contractor's Environmental Manager (EM): • Overall responsibility for ensuring that the Scheme complies with all environmental legislation, consents, objectives, targets and other environmental commitments, including those arising from the Environmental Statement throughout the relevant project phase. 2. Role - The Principal Contractor's Ecological Clerk of Works (ECoW): • Overall responsibility for ensuring that the Scheme complies with all ecological legislation and consents, including the Development Consent Order and those arising from the Environmental Statement throughout the relevant project phase. 3. Role - The Archaeological Clerk of Works (ACoW): • Overall responsibility for ensuring that the Scheme complies with all archaeological and heritage legislation and consents, including the Development Consent Order and those arising from the Environmental Statement throughout the relevant project phase. 4. Role – Traffic Management Officer:

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		• The traffic management officer will ensure compliance with the contractors traffic management plan in accordance with the Development Consent Order. Additional responsibilities include ensuring that the Traffic Management Contractor (TMC) referred to above manages and implements the traffic management measures identified within the Outline Construction Traffic Management Plan **[APP-244]**. 5. Role - The Principal Contractor's Environmental Specialist(s): • Overall responsibility for ensuring that the Scheme complies with all relevant legislation and consents, including the Development Consent Order and those arising from the Environmental Statement throughout the relevant project phase. The roles set out above will report to the Principal Contractor's Project Manager via the Principal Contractor's Environment Manager. Archaeological Mitigation Strategy The Archaeological Mitigation Strategy **[APP-238]** makes reference to the ACoW referred to above. In addition, reference is made to the Archaeological Contractor who will be responsible for the delivery of the archaeological mitigation programme, as set out in the Archaeological Mitigation Strategy **[APP-238]**. The ACoW will be responsible for monitoring the work undertaken by the Archaeological Contractor. Biodiversity Pre-Commencement Plan The Biodiversity Pre-Commencement Plan **[APP-239]** does not specify roles and responsibilities, although reference is made throughout the document to the ECoW referred to above. This includes the following responsibilities: • Confirmation of no biodiversity constraints in the area where site clearance or demolition is taking place. • Overseeing the removal of bankside vegetation within 8 metres of any watercourse if clearance is necessary. • Overseeing site clearance operations in sensitive habitats. • The production of Method Statements where required. • Conducting surveys where specified.
Q1.7	**Draft Development Consent Order (dDCO)**	
Q1.7.1	**General**	

No.	Directed to	Question
Q1.7.1.1	Applicant	**Question:** **Template and best practice guidance** a) Confirm that the submitted dDCO has been drafted using the Statutory Instrument template. b) Confirm that the submitted dDCO and EM follows best practice drafting guidance from the Planning Inspectorate set out in Advice Note 15, providing in tabular format, brief explanation of how each aspect of Advice Note 15 has been addressed.
		Answer: a) The dDCO **[APP-025]** was drafted using the Statutory Instrument Template and this is confirmed by the Order Validation Confirmation email **[APP-026]**. b) The Applicant confirms that the dDCO and Explanatory Memorandum **[APP-028]** have been drafted following the best practice guidance from the Planning Inspectorate set out in the Advice Note 15. The Table of Compliance with Advice Note 15 is appended to this document at Appendix to Q1.7.1.1.
Q1.7.1.2	Discharging Authorities	**Question:** **Discharging Requirements and Conditions** All discharging authorities to check the Schedules in the dDCO for accuracy and provide the ExA with suggested corrections and amendments.
		Answer: No response required from Applicant.
Q1.7.1.3	Applicant	**Question:** **Authorities and Statutory Undertakers** a) Provide a list or table of specifically named authorities and undertakers that are relevant in the dDCO for each and every reference to the following. Please list separately, instances where any of the following, for example 'local authority', refers to different body or bodies.

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		• highway authority or highways authority • lead local flood authority • local highway authority • local planning authority • street authority • local authority • public authority • acquiring authority • fire and rescue authority • internal drainage board • drainage authority • sewerage undertaker • statutory undertaker • crown authority The ExA acknowledges that such a list would be subject to change over the course of the Examination and afterwards. b) Provide a list or table of all relevant discharging authorities for all requirements and conditions.
		Answer: a) The Applicant has prepared the Authorities and Statutory Undertakers table which sets out the specifically named authorities and statutory undertakers that are relevant to the dDCO **[APP-025]**. This table can be found at Appendix Q1.7.1.3 to this document. b) The discharging authority for all requirements is the Secretary of State, following consultation with other bodies as appropriate, for example the relevant planning authority or relevant local highway authority.

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Q1.7.2	**Definitions**	
Q1.7.2.1	Applicant	**Question:** **Pre-commence and pre-commencement** The definition of commence in the dDCO **[APP-025]** excludes a number of activities from "operations consisting of archaeological investigations and mitigation works" to "the temporary display of site notices or advertisements". The EM [APP-028, paragraph 4.1.6.a] refers to these excluded activities as pre-commencement operations, and the dDCO refers to a pre-commencement works plan as a certified document. a) Should "pre-commence" and "pre-commencement" be defined in the dDCO? Explain with reasons. b) Provide suitable wording for a definition.
		Answer: a) In our view, definitions for "pre-commence" and "pre-commencement" are not necessary to separately define within the dDCO **[APP-025]** on the basis that there is a definition of "commence" in Article 2 of the dDCO which sets out a number of exclusions. The type of activities that would qualify as pre-commencement works are those that would fall within one of the exceptions to "commencement" as defined within the dDCO. b) As noted above, while the Applicant does not consider that definitions of "pre-commencement" or "pre-commence" are necessary, without prejudice to the Applicant's position, the Applicant has provided a possible definition should the ExA consider it is necessary to include it withinArticle 2 of the dDCO **[APP-025]**: *"pre-commence" means carrying out any 'pre-commencement work' and the term "pre-commencement" will be construed accordingly.* *"pre-commencement work" means:* *(a) archaeological investigations and mitigation works;* *(b) environmental surveys;* *(c) pre-construction mitigation works;* *(d) investigations for the purpose of assessing and monitoring ground conditions and levels;*

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		(e) remedial work in respect of any contamination or other adverse ground conditions *(f) erection of any temporary means of enclosure;* *(g) temporary hard standing;* *(h) receipt and erection of construction plant and equipment;* *(i) diversion and laying of underground apparatus and utilities* *(j) protection works* *(k) demolition (save in relation to Brook Cottages)* *(l) site clearance* *(m) construction compound set up; and* *(n) the temporary display of site notices or advertisements;* During the Issue Specific Hearing on 18 August 2021, the ExA set out the following action (Action 10 as set out in the Hearing Actions Points) for the Applicant: *Propose suitable wording for definition of pre-commencement and details of a pre-commencement plan that could be included in the First Iteration Environmental Management Plan (EMP).* The Applicant has set out a proposed definition of pre-commencement above. However, it is not necessary to provide details of a pre-commencement plan that could be included in the First Iteration Environmental Management Plan (EMP) **[APP-234]** for two reasons. First, in accordance with Requirements 9 and 20 of the dDCO **[APP-025]** all works forming part of the authorised development must be carried out in accordance with the Archaeological Mitigation Strategy [APP-238] and the Biodiversity Pre-Commencement Plan **[APP-239]**. It is the Applicant's view that together these two documents contain the necessary controls required for the 'pre-commencement works'. Second, the elements secured in the First Iteration EMP will be further developed and included in the Second Iteration EMP in accordance with Requirement 3 of the dDCO **[APP-025]**. The Second Iteration EMP must be approved by the Secretary of State prior to commencement of the Authorised Development and as such does not control or relate to the 'pre-commencement works'. As noted above, it is for this reason that the Applicant has ensured both the Archaeological Mitigation Strategy **[APP-238]** and the Biodiversity Pre-Commencement Plan [APP-239] would apply to pre-commencement works.

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Q1.7.2.2	Applicant	**Question:** **Maintain** The ExA notes that the definition of maintain includes reference to materially new or materially different environmental effects to those identified in the environmental statement. Explain the limits that would need to be placed on activities to alter, remove, reconstruct, and replace any part of the authorised development to ensure the effects are within those identified in the environmental statement, especially the effects on the local highway network and non-motorised users.
		Answer: The maintenance provisions included in the dDCO **[APP-025]** are consistent with the Applicant's duties under sections 41 and 329 of the Highways Act 1980 and powers under Part 9 of Schedule 2 to the Town and Country Planning (General Permitted Development) (England) Order 2015 (the GPDO). The inclusion of the words 'alter, remove, reconstruct and replace' cover matters that are considered to be integral elements of the Applicant's existing maintenance powers. Article 5 supplements the maintenance powers under the Highways Act 1980 and ensures that the Applicant has the necessary powers to maintain the authorised development. The Applicant must have the ability to respond to maintenance issues associated with the strategic highway quickly, to ensure it operates safely and efficiently. The Applicant notes that this formulation of "maintain" has been approved by the Secretary of State in respect of the following highway DCOs: • The A19/A184 Testo's Junction Alteration Development Consent Order 2018. • The M42 Junction 6 Development Consent Order 2020. In practical terms it is foreseeable that over the design life of the Scheme it would become necessary for some elements to be removed, replaced or reconstructed as part of the Scheme's maintenance, for example the surfaces of carriageways. It should also be noted that the power to "maintain", contained in Article 5 (maintenance of the authorised development) of the dDCO, is a power to "maintain the authorised development" and so any such works of

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		maintenance must be within the bounds of what is authorised to be constructed under the Order, and within the scope of Article 6 (limits of deviation). The Applicant considers that the flexibility of this definition is appropriately constrained by reference to the environmental impacts that have been identified in the environmental statement to avoid the possibility of the dDCO giving consent for an environmental impact that has not been assessed.
Q1.7.2.3	Applicant	**Question:** **Secretary of State** a) Should there be a definition for Secretary of State, in light of Section 6 in Advice Note 15? b) If a definition is deemed essential, then should there be a definition for Secretary of State for Department for Business, Energy and Industrial Strategy, in the event that the diversion of the high pressure pipeline does qualify as an NSIP in its own right?
		Answer: a) The Applicant is of the view that including a definition of the Secretary of State within the dDCO **[APP-025]** provides clarity to the dDCO. This is particularly the case given the possibility of an additional nationally significant infrastructure project (NSIP). b) Further to submission of the Application for Development Consent, the Department for Transport and the Department for Business, Energy and Industrial Strategy (BEIS) have issued a joint letter dated 30 July 2021 confirming that it has been agreed that the Secretary of State (SoS) for Transport would be the sole decision maker for the A428 Scheme and that the SoS for BEIS will be consulted on the recommendations made by the Examining Authority in relation to the energy NSIP and his comments will be taken into account when the SoS for Transport is making his decision. Based on this, the Applicant is of the view that a separate definition of the Secretary of State for BEIS is not necessary within the dDCO **[APP-025]**. The letter referred to above can be found on the Planning Inspectorates website here: https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2021/08/DfT-BEIS-TR010044-TR010032-Transport-DCOs-with-energy-elements.pdf.

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Q1.7.3	**Articles**	
Q1.7.3.1	Applicant	**Question:** **Article 2(4) and 2(5) – Interpretation** a) Should Article 2(4) clarify that measurements and distances in this dDCO, while 'approximate' will remain within the limits of deviation in Article 9. Explain giving reasons and provide suitable wording. b) In Article 2(5), what is the expected tolerance for the areas described in the book of reference? Would the limits of deviation be applicable here? If yes, should there be a reference to the limits of deviation in Article 9? Explain giving reasons and provide suitable wording.
		Answer: a) While the Applicant does not disagree with the limitation, it is the Applicant's view that a change to Article 2(4) of the dDCO **[APP-025]** is unnecessary. As drafted, Article 2(4) does not grant the Applicant any additional powers to override the general premise within Article 9 of the dDCO that restricts the authorised development from being constructed outside of the limits of deviation unless it can be demonstrated to the satisfaction of the Secretary of State that a deviation in excess of the limits of deviation would not give rise to any materially new or materially different environmental effects. Article 2(4) has precedence in a number of made Orders as set out in paragraph 4.1.9 of the Explanatory Memorandum **[APP-028]** and seeks to acknowledge that until the Scheme is constructed the precise lengths of specific elements of the authorised development cannot be certain. b) Article 2(5) of the dDCO **[APP-025]** refers to all land within the Order limits and as such the limits of deviation in Article 9 would apply. However, as above, it is the view of the Applicant that cross reference to the limits of deviation in Article 9 of the dDCO **[APP-025]** is not necessary within Article 2(5). This is because this provision merely allows for a small tolerance with respect to the areas described in the Book of Reference **[APP-032]**. As above, this article has precedent in the same made Orders as set out in paragraph 4.1.9 of the Explanatory Memorandum **[APP-028]**.
Q1.7.3.2	Environment Agency Internal drainage boards	**Question:** **Article 3 – Disapplication of legislative provisions**

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	Lead local flood defence authorities Natural England	Do you have any concerns regarding the disapplication of consents under Article 3? Explain with reasons.
		Answer: No response required from Applicant.
Q1.7.3.3	Applicant	**Question:** **Article 4 – Development consent etc. granted by the Order** Define the scope and extent of land adjacent to and outside Order limits in Article 4. Where is the scope and extent secured in the dDCO?
		Answer: This Article has precedence in the M20 Junction 10a Order (article 5(2)) and the A14 Order (article 5(2)). In essence this Article confirms that if there are other enactments in force within or adjacent to the Order limits, that they will still exist and are not removed by the Order but merely that they will be subject to the terms of the Order. Section 120 of the 2008 Act provides that: *"…(5) An order granting development consent may –* *(a) Apply, modify or exclude a statutory provision which relates to any matter for which provision may be made in the order;* *(b) make such amendments, repeals or revocations of statutory provisions of local application as appear to the [Secretary of State] to be necessary or expedient in consequence of a provision of the order or in connection with the order;* *(c) include any provision that appears to the [Secretary of State] to be necessary or expedient for giving full effect to any other provision of the order…"* Article 4(2) in the dDCO **[APP-025]** has been included and is necessary in order to ensure that there are no acts of a local or other nature that would hinder the construction and operation of an Nationally Significant Infrastructure Project (NSIP). The Applicant carried out a proportionate search of local legislation within a reasonably close proximity to land within the Order limits, but no search can be completely conclusive and there remains the possibility

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		that a local act or provision may have been overlooked. Accordingly, there is a chance that there may be some statutory provisions which would fall within (a) or (b) above. As such the Applicant has therefore taken a cautious approach in including this Article (which, as noted in the Explanatory Memorandum (EM) **[APP-028]**, has been accepted on other consented schemes such as the M20 Junction 10a Order 2017). Including this Article ensures that the construction and operation of the Scheme are not jeopardised by any incompatible statutory provisions which might exist i.e. a provision which would be an absolute restriction that could not be dealt with unless by the DCO. The Applicant also notes the Secretary of State's (SoS's) general power in s.120(5)(c) to include within the order any provision that appears to be necessary or expedient for giving full effect to any other provision of the order. The Applicant considers that this power should be exercised here on the basis that there is still a risk that relevant provisions have not been identified, despite the Applicant's search of statutory provisions that may affect the Scheme. In terms of the geographical scope of Article 4(2), 'adjacent' means any land which is next to the land inside the Order limits but does not fall within the Order limits itself. Quite how far this extends to is a matter of fact and degree to be considered on a case-by-case basis. The Applicant takes the view it is necessary to include such land as there may be statutory provisions that are expressed to relate to land which falls just outside the Order limits, but may also have an effect on land within the Order limits. An example might be railway legislation which prevents particular activities from taking place on land adjacent to the railway. In that case, if the land within the Order limits were adjacent to the railway for the purposes of the railway legislation, then the railway would be "adjacent" to the Order limits for the purposes of the dDCO. The Applicant does not consider that this provision should only apply to land within the Order limits, for the reasons set out above. During ISH1 the Examining Authority (ExA) has set the Applicant an action (Action 9 from the Hearing Action Points) as set out below: *Provide example(s) where the provision of 'adjacent land' in other made DCOs had been enacted on land described as 'adjacent to' order limits.* In response to this Action, the Applicant has made enquiries of some other Highways England DCO schemes to determine whether Article 4(2) has ever been enacted in practice. Unfortunately, our enquiries to date have not revealed any practical applications of Article 4(2).

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Q1.7.3.4	Applicant Local Highway Authorities	**Question:** **Article 5 – Maintenance of authorised development, and Article 13 – Construction and maintenance of new, altered or diverted streets and other structures** a) Applicant, are there any other instances, other than those identified in Article 13, where an agreement made under this Order would constitute the exception referred to in Article 5. b) LHAs, comment on the provision in Article 13 in relation to maintenance of new, altered or diverted streets and other structures.
		Answer: a) In addition to the instances identified in Article 13 of the dDCO **[APP-025]**, the Applicant could envisage a situation where there may be a need to agree maintenance obligations under the Order with a third party, for example with a statutory undertaker who would have the powers to maintain its apparatus within the Order limits. It is not possible to predict at this stage all possible maintenance scenarios and as such it is essential that this flexibility remains as part of the DCO. The Applicant also notes that Article 5 has precedence in a number of made highways orders including The A585 Windy Harbour to Skippool Highway Development Consent Order 2020 and The A19 Downhill Lane Junction Development Consent Order 2020.
Q1.7.3.5	Applicant Local Authorities	**Question:** **Article 6 – Application of the 1990 Act** a) Applicant, list the instances where the temporary construction works will be delivered under Article 6, identifying the relevant local authorities and effected landowners. b) LAs, comment on reasonableness of Article 6(3), in particular "any temporary works constructed un*der this Order may be retained permanently*", and highlight any concerns.
		Answer:

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		a) When including this provision in the dDCO **[APP-025]** the Applicant had in mind the construction of the temporary roundabout access at the Wintringham Construction Compound (Work No.74) (Compound) within the District of Huntingdonshire. The current owners of the Compound are Wintringham Partners LLP who also occupy the site along with Urban & Civic plc. While it is the Applicant's intention that any access arrangements constructed for the Compound are to be removed when the land is reinstated, the Applicant is also aware of the development proposals permitted at this site. As described in the Case for the Scheme **[APP-240]** (paragraphs 3.3.7 – 3.3.9), the Compound sits within a wider proposed residential development which will be brought forward after the use of the construction compound has completed. Should the owner of this compound and the local highway authority (in this case Cambridgeshire County Council) agree that the temporary access can remain then it would be the intention of the Applicant to reduce potential environmental impacts of re-instatement and the subsequent creation of a new roundabout to serve the proposed residential development, by re-using the roundabout to serve the proposed residential development.
Q1.7.3.6	Applicant Local Authorities	**Question:** **Article 7 – Planning permission** a) Applicant, should (1) appear at the start of the first line? b) LPAs and Applicant, are there any extant Planning Permissions issued pursuant to the 1990 Act within he Order Limits that will be relevant under Article 7(2)?
		Answer: a) Agreed, this amendment will be included in the next draft of the dDCO **[APP-025]** to be submitted at Deadline 1. b) While there may be others, the planning permission in contemplation by the Applicant when including this provision related to the Black Cat Quarry (the Quarry) which is an existing quarry site. As set out at paragraphs 3.3.4-3.3.5 of the Case for the Scheme **[APP-240]**, it operates under temporary planning permission 15/02551/EIAWM, granted by Bedford Borough Council in April 2016, for the extraction of sand and gravel with restoration to agriculture and nature conservation. In July 2017 an updated restoration scheme with the oil and gas pipelines crossing the site retained in situ was approved by Planning Permission 17/00462/AOC. In 2018

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		Planning Permission 17/03160/S73WM varied the approved operating hours and vehicle numbers of the quarry. Condition 3 of this permission also sets the approved end date for mineral extraction to be no later than 15 September 2020. The temporary planning permission is expected to expire on 7 October 2022. As stated at paragraph 4.1.29 of the Explanatory Memorandum **[APP-028]**, this power is necessary for the Scheme because of this extant planning permission for the Quarry. Where the Order Limits fall within the land subject to that planning permission the Applicant will not be in breach of that planning permission.
Q1.7.3.7	Applicant Local Authorities	**Question:** **Article 9(1) – Limits of deviation** a) The Applicant proposes differing maximum limits of deviation, depending on the works number, represented by coloured shading on each works plan. Why has the Applicant not proposed a consistent, specific maximum distance limit of horizontal deviation in the dDCO (as has been adopted for vertical limits of deviation)? b) Do Local Authorities consider the approach taken to be acceptable? If not, explain why.
		Answer: **a)** The Applicant refers the ExA to paragraph 2.5.7 of Chapter 2, The Scheme of the Environmental Statement **[APP-071]** which clarifies that the "*purpose of the LoD [Limits of Deviation] are to allow minor modifications and refinements to be made to the preliminary design, where necessary during the detailed design and construction phases.*". The Works Plans **[APP-009] [APP-010]** present the extents of the following limits, within which lateral deviation would be permissible: • Limits of Deviation associated with utility diversions and protections. • Limits of Deviation associated with non-utility works. • Limits of Deviation associated with proposed gantries. The lateral limits of deviation shown by the colour shading is for all non-utility works, this includes items such as drainage and landscaping of the authorised development and not based solely on the road alignment. The reason for this is that the design elements that make up the authorised development are inter-dependent and a lateral and/or vertical deviation in one element will impact another with the potential for these impacts to be compounded and not

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		necessarily a linear/uniform deviation. This proposal of lateral limits of deviation allows for the flexibility to adjust the design in a holistic manner whilst providing an efficient use of the land. Showing the limits of deviation (LoD) using lines or shading on the Works Plans is a common approach for linear schemes consented by way of DCO (see paragraph 4.1.33 of the Explanatory Memorandum **[APP-028]** for examples). Article 9 of the dDCO **[APP-025]** provides the required certainty whilst, at the same time, allowing the Applicant the necessary and required flexibility to be able to build and deliver this NSIP. Specifying the exact dimensions of the relevant parameters and the LoD (both horizontally and vertically), in tabular form or otherwise, is not necessary for the reasons given above and would also unduly constrain the ability of the Applicant to deliver the Scheme. The LoD are further constrained as follows: a) in practice, the location of the highway works will naturally be limited by the need to tie into the existing network of highways; b) in relation to the linear Works, the position is further clarified by the inclusion of the approximate commencement and termination points of those Works on the Works Plan, and by descriptions of their approximate length in Schedule 1 to the dDCO; c) the indicative position of the non-linear works are shown on the Works Plans [APP-009 – APP 010]. The works cannot be moved anywhere within the Order limits as the works are geographically constrained by reference to the description of the works in Schedule 1; and d) what can actually be built in any particular location is governed by Requirement 12 of Schedule 2 to the dDCO, [APP-025] which provides that: i. the detailed design of the authorised development must accord with: (a) the preliminary scheme design shown on the works plans, the general arrangement plans and the engineering section drawings; and (b) the principles set out in the environmental masterplan; and ii. that amendments would not give rise to any materially new or materially different environmental effects in comparison with those reported in the Environmental Statement, unless otherwise agreed with the Secretary of State following consultation with the relevant local planning authority on matters related to their functions.

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Q1.7.3.8	Applicant	**Question:** **Article 9(2) – Limits of deviation** a) Justify the provision for exceedances beyond the stated vertical limits of deviation. b) At what stage and how will the Applicant demonstrate to the Secretary of State's satisfaction that exceeding the limits of deviation (if required) would not lead to materially new or different environmental effects from those reported in the Environmental Statement? If this would be through post consent change request, should that be clarified in the dDCO **[APP-025]**, and justified in the EM?
		Answer: a) The Article is proportionate and necessary to avoid delaying the Scheme in the event of emerging issues during construction, and allows the Secretary of State to vary the limit of deviation in the vertical or horizontal plane; but only where the variation would not give rise to any materially new or materially different environmental effects from those reported in the Environmental Statement. This restriction provides the certainty that the built Scheme will not be materially different from that assessed. b) Whether or not an exceedance of the limits of deviation are required will not be known until the detailed design of the Scheme is complete, post consent. This means that at the point when an exceedance is deemed necessary by the Applicant, it would apply to the Secretary of State under Article 9 to seek consent for such an exceedance. As part of that application to the Secretary of State, the Applicant would need to provide environmental information to the Secretary of State that explains and justifies that no materially new or materially different environmental effects in comparison with those reported in the Environmental Statement would occur as a result of the exceedance of the limits of deviation. Therefore, this would not require a formal change request to be sought to the Order as made because the dDCO **[APP-025]** provides a process within which this can occur subject to the above confirmation regarding environmental effects.
Q1.7.3.9	Applicant	**Question:** **Article 11 – Consent to transfer benefit of Order** The EM **[APP-028]** states that the *"equivalent provision in this article is drafted more widely"*. Provide justification of

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		the instances where the provision in this article are more widely drawn.
		Answer: The Explanatory Memorandum **[APP-028]** sets out the basis for the draft article building on provisions of other DCOs and in particular some of those secured by the Applicant on other schemes. As there are a number of statutory undertakers (as listed in Article 11(5)) and third parties who need to be able to rely on the new rights (over land as listed in Part 3 of Schedule 4 to the dDCO **[APP-025]**) it would be too cumbersome to require consent on each occasion. Where the benefit of those rights can be relied upon in these limited circumstances without consent being required from the Secretary of State the liability for any compensation will remain with the undertaker.
Q1.7.3.10	Applicant Local Highway Authorities	**Question:** **Article 13 – Construction and maintenance of new, altered or diverted streets and other structures** a) Applicant, explain the meaning of "from its completion"; what would determine "completion" of any highways that would be constructed under this Order? Where is this described, and where in the dDCO is the meaning of 'completion' secured? b) LHAs, do you have any concerns with the provisions in Article 13?
		Answer: a) When 'completion' occurs will be a question of fact and degree to be determined by the Applicant in connection with the relevant local highway authority and will be further defined in the legal agreement between the parties. Article 13 requires that completion is carried out to the reasonable satisfaction of the relevant local highway authority and as such both parties will need to agree when this has occurred. As this is a question of fact and degree to be agreed between the Applicant and the relevant local highway authority, it is the Applicant's view that this cannot be defined more specifically within the dDCO **[APP-025]**. There is a legal agreement currently with the local highway authorities which, when agreed, will include a process for handing over of assets. The Applicant would also note that paragraph 4.1.46 of the Explanatory Memorandum **[APP-028]** states that this provision was included in a number of made Highways England orders to date.
Q1.7.3.11	Applicant Local Highway	**Question:** **Article 14 – Classification of roads, etc.**

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	Authorities Local Authorities	a) Applicant, explain the meaning of "*completed and open for traffic*"; what would determine the roads described in the dDCO are "completed" and 'open for traffic'? Where is this described, and where in the dDCO is the meaning of "completed" and "open for traffic" secured? b) Should "authorised vehicle" be defined in Article 2? Explain giving reasons, and provide suitable wording. c) LHAs and LPAs, do you have any concerns with the provisions in Article 14?
		Answer: a) The date that the authorised development is 'completed and open for traffic' will be a question of fact and degree. This will be determined when the Applicant officially opens the highway for use by the general public and the works have been completed (see the response to Q1.7.3.10). Given these phrases will be determined as a matter of fact and degree, it is not appropriate for them to be, secured within the dDCO **[APP-025]**. As set out in paragraph 4.1.197 of the Explanatory Memorandum **[APP-028]** this provision has wide precedent across many Highways England orders. b) The definition of "authorised vehicle" is contained within Article 14(15) of the dDCO **[APP-025]** and given its limited application throughout the dDCO it is the Applicant's view that it is unnecessary to include this in Article 2 of the dDCO.
Q1.7.3.12	Applicant	**Question:** **Article 17 – Temporary alteration, diversion, prohibition and restriction of the use of streets** Can you define "*reasonable time*" in Article 17(1)?
		Answer: It is not possible to place a precise time limit on what may be considered a "reasonable time" in each instance at this stage. However, the usual interpretation of this term will be applied in practice which means that the undertaker may only use this power for the amount of time that is required and reasonable in the context of the level of disruption caused and the work that is required to be carried out.

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		Further, in accordance with Article 17(5) of the dDCO **[APP-025]** any person who suffers loss by the use of this power is entitled to compensation to be determined, in the case of a dispute, under Part 1 of the Land Compensation Act 1961. As set out in paragraph 4.1.71 of the Explanatory Memorandum **[APP-028]** this article has been used on previous development consent orders.
Q1.7.3.13	Local Highway Authorities	**Question:** **Article 20 – Clearways, prohibitions and restrictions** Are LHAs in agreement with the intended role and powers of a Traffic Officer? If not, explain why.
		Answer: No response required from Applicant.
Q1.7.3.14	Cambridgeshire County Council	**Question:** **Traffic Manager responsibilities** CCC describe the Traffic Manager responsibilities in the dDCO as being unacceptable [RR-013], provide more detail, including appropriate referencing and any suggested amendments.
		Answer: No response required from Applicant.
Q1.7.3.15	Applicant Local Authorities Affected Persons	**Question:** **Article 22(4) – Protective work to buildings** Is 14 days adequate notice for the undertaker to serve notice on the owners and occupiers of the building of its intention of carrying out protective works under this article, specifying the works proposed to be carried out?
		Answer:

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		By its nature this is a temporary power to enter onto land to undertake protective works to buildings. As set out in the Explanatory Memorandum **[APP-028]** paragraphs 4.1.89-4.1.91 the power has been included within other DCOs and the same 14 days' notice period was permitted. Even where there is no emergency (when no notice is required) the reason for carrying out protective works is to either repair or prevent damage and so it is expedient to do so at relatively short notice. It is necessary to set out what works are required when entering buildings to carry out works. Compensation is also payable for any loss or damage caused.
Q1.7.3.16	Applicant	**Question:** **Article 23** - Authority to survey and investigate the land a) Provide further details about the type and quantity of soil and water referred to in Article 23(1)(b)(ii). b) Provide further details about scope and size of the excavations or trial holes referred to in Article 23(1)(b)(iii). c) Define the scope and extent of land which is adjacent to, but outside the Order limits, in Article 23(1).
		Answer: a) Where trial holes or boreholes are installed on land adjacent to but outside the Order limits, typically and by way of an example, a small fenced compound of approximately 5m x 10m would be established to secure the area of the trial hole / borehole sample locations. Boreholes would typically be installed using cable percussion, rotary or hydraulic driving methods. Trial holes would, for example typically be in the order of 2.5m x 2.5m in area and excavated approximately 2.5m in depth – from each trial hole it would be typical for a sample of up to 0.5m3 of material to be recovered and removed from site for testing. Typically where deeper soil samples are required a rig will be established within the compound and a borehole of up to 200mm in diameter and 30m in depth installed. Soil samples of up to 0.5m3 will be recovered from the full depth of the borehole. Where water samples are required from ground water or surface water discharge it would be usual for a volume of no more than 5 litres to be required for each sample. b) As noted above, trial holes would, by way of an example, typically be in the order of 2.5m x 2.5m in plan area and excavated approximately 2.5m in depth.

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		c) The extent of this power will only extend to land adjacent to the Order limits as far as 'reasonably necessary' to carry out the activities listed in Article 23 (1)(b) of the dDCO **[APP-025]**. As such, it is not possible to define the precise extents of this but it should be noted that in order for something to be "reasonably necessary" it must be connected to the authorised development and must fall within one of the activities listed in Article 23(1)(b). Further, there is no need to monitor or control this power on the basis that its application will be limited and only used when reasonably necessary for the purposes specified.
Q1.7.3.17	Local Authorities Affected Persons National Farmers Union Applicant	**Question:** **Article 23 - Authority to survey and investigate the land** a) Comment on the provision in Article 23(1) for the undertaker to, for the purposes of the construction, operation or maintenance of the authorised development, enter any land which is adjacent to, but outside the Order limits. b) In Article 23(2), is 14 days adequate notice for the undertaker to enter land and place equipment for the purposes of survey or investigation? Applicant to comment.
		Answer: a) This article is based on Schedule 1 paragraph 16 of the Infrastructure Planning (Model Provisions)(England and Wales) Order 2009 (Model Provisions) which, whilst no longer in force, were prepared as a guide for developers when preparing DCOs and are still considered useful for drafting DCOs. However, the drafting in Article 23(1) of the dDCO **[APP-025]** departs from the model provisions by authorising surveys, where reasonably necessary, on land outside but adjacent to the Order Limits. This extension beyond the Order Limits has precedent in the Silvertown Tunnel Order and the M42 Junction 6 Order. Powers to make excavations and boreholes, to investigate groundwater and discharge water onto land are also included, to ensure that Highways England is able to undertake all necessary activities in connection with surveying the land. The Applicant has included within the Order limits all land that it considers is necessary to deliver the Scheme. However, the Applicant can envisage circumstances where it would be necessary to carry out surveys outside the Order limits to facilitate the delivery of the Scheme. The Applicant is not at this time able to identify exhaustively the land adjacent to, but outside the Order limits where surveys or investigations under this article may be required. Surveys or investigations outside of the Order limits may be required to survey ecological receptors in land adjacent to the Order limits where construction activities are taking place in the Order limits, for example.

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		Similarly, it may reasonably be necessary to survey groundwater levels at locations outside of the Order limits to respond to unforeseen and unforeseeable circumstances. b) The 14 day period was included in the Model Provisions and numerous other granted development consent orders including the recently granted A303 (Amesbury to Berwick Down) Development Consent Order 2020; The A63 (Castle Street Improvement, Hull) Development Consent Order 2020; The A1 Birtley to Coal House Development Consent Order 2021; The A19 Downhill Lane Junction Development Consent Order 2020; and The A303 Sparkford to Ilchester Dualling Development Consent Order 2021. The 14 day period is therefore considered adequate. The Applicant needs to ensure that the Scheme can be carried out efficiently and expeditiously following the making of the Order. Therefore, a longer notice period is considered to be unnecessary given that people living in the vicinity of the Scheme will already have had prior notice via consultation. In addition, compensation is also payable for any loss or damage caused.
Q1.7.3.18	Applicant	**Question:** **Article 25 – Compulsory acquisition of land** Should Article 25(1) reference the certified land plans, securing the compulsory acquisition of land to the order limits marked in the land plans? Explain with reasons.
		Answer: Article 25(1) of the dDCO **[APP-025]** is based on the drafting in Schedule 1 paragraph 18 of the Model Provisions. The power is linked to the land plans through the reference to "Order land", which is defined in the dDCO as "the land shown on the land plans which is within the limits of land to be acquired or used permanently or temporarily and described in the book of reference". It is therefore not necessary to expressly reference the land plans in the wording of the Article.
Q1.7.3.19	Applicant	**Question:** **Article 27 – Time limit for exercise of authority to acquire land compulsorily** How long after taking possession of land (if the undertaker took possession within the 5 years limit) would the undertaker keep possession of land acquired for temporary use under Article 40?

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		Answer: The exercise of powers under Article 40 of the dDCO **[APP-025]** is subject to the same 5 year period as is mentioned in Article 27 and the undertaker is permitted to remain in possession beyond 5 years of the date of the Order if temporary possession has already been taken at that point. Article 40(3) imposes time limits on temporary possession once the works have concluded. The undertaker must not (without agreement of the owners of the land) remain in possession of any land: • Taken under Article 40(1)(a)(i) after the end of the period of one year beginning with the date of completion of the work no. specified in column 4 of Schedule 7. This is the time limit set out in Schedule 1 paragraph 28 of the Model Provisions. • Taken under Article 40(1)(a)(ii) after the end of the period of one year beginning with the completion of the work for which temporary possession of the land was taken, unless the undertaker has served a notice of entry under section 11 of the Compulsory Purchase Act 1965 or made a GVD under section 4 of the Compulsory Purchase (Vesting Declarations) Act 1981 (ie sought to acquire the land permanently). As set out in response to Q1.7.3.21b) below the Applicant has set out the current programme for the works with the Scheme is set to open to traffic in May 2026. On that basis the extent of temporary possession of some land under Article 40 could extend up to May 2027.
Q1.7.3.20	Applicant	**Question:** **Article 28 – Compulsory acquisition of rights and imposition of restrictive covenants** a) Confirm this Article applies only to Compulsory Acquisition of land by the undertaker. b) If so, explain why the undertaker would need to impose restrictive covenants on land that it has acquired. In that regard, also explain Article 28(4). c) Schedule 5 sets out the new rights for the benefit of relevant statutory undertakers or landowners. Where is the corresponding list of restrictive covenants for the undertaker? d) In Article 28(6), what do you mean by 'greater interest' in that land?

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		Answer: a) This Article applies to the Order land, which is the land shown on the land plans and the power is provided to the undertaker. Although this is subject to the transfer of benefit provision included at Article 11 of the dDCO **[APP-025]**. Article 11(5) of the Order transfers the benefit of the Order to various statutory undertakers in relation to specific utility diversions. The acquisition of new permanent rights or restrictive covenants over land are authorised in the following circumstances: i. On land authorised for permanent acquisition in the dDCO **[APP-025]** (and identified as such on the land plans) where instead of the undertaker acquiring that land permanently it may acquire new rights or impose restrictive covenants which will reduce the extent of permanent acquisition and the landowner will in those circumstances retain its freehold of that land. ii. Those powers explained in i) above may be exercised by statutory undertakers, or by those parties who by necessity require new rights by virtue of a stopping up of a private means of access but only by owners or occupiers of land identified in column (4) of the table in Part 3 of Schedule 4 of the dDCO **[APP-025]**. This requires the undertaker's consent and may be subject to terms and conditions. iii. Where any plots are identified in Schedule 5 of the dDCO, permanent acquisition of land is not authorised and only the acquisition of new rights or imposition of restrictive covenants is permitted over that land. b) Although land is scheduled for acquisition the undertaker may not need to acquire the whole plot permanently or at all and so seeking to impose a lesser level of Compulsory Acquisition is considered appropriate and proportionate by way of acquisition of new rights only and there is the express limitation for the acquisition of new rights only as provided by Article 28(4). The Scheme includes a high number of utility diversions and in circumstances where new rights only are being acquired there is also a need to impose restrictive covenants on the diversion routes to ensure the new apparatus is protected from excavation or from being built over. c) Schedule 5 of the dDCO **[APP-025]** lists both rights and restrictive covenants in column (2) and it is a combination for both the undertaker and statutory undertakers. See for example plot 1/10f which refers to "restrictive covenants for protecting the installed apparatus from excavation and to prevent access to the installed apparatus being made materially more difficult". The Applicant will amend the heading of column (2) to include a reference to restrictive covenants. d) A "greater" interest means an interest with higher status for example a leasehold interest or freehold interest is a "greater" interest than a right or restrictive covenant. As a result, where a right or restrictive covenant is to be

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		acquired and a counter notice is served the undertaker is not required to acquire a greater interest in that land other than that acquired under the dDCO. The cross reference in Article 28(6) needs to refer to Paragraph 5(8) of Schedule 6 and the dDCO will be updated.
Q1.7.3.21	Applicant Affected Persons	**Question:** **Article 40 – Temporary use of land for carrying out the authorised development and Schedule 7 – Land of which temporary possession may be taken** a) List the plots effected by Article 40(1)(d), and indicate if you have or have not reached agreement with landowners. b) In Article 40(3)(a), what determines "the date of completion of the part of the authorised development specified in relation to that land" and where is this secured? c) Applicant provide justification for the significant exclusions listed in Article 40(4)(a)-(f). d) Affected Persons, comment on Article 40(4) and 40(7) if it effects your plot.
		Answer: a) The Applicant has prepared a table setting out the Permanent Works on Temporary Land which is attached to this document at [Appendix Q1.7.3.21]. The table details all of the temporary possession plots in Schedule 7 of the dDCO and specifically identifies whether permanent works or mitigation works are required for that plot. 100 out of the 272 plots listed in schedule 7 will either have permanent works or mitigation works on them. Out of those 100 plots, 26 of them are either owned by the Applicant or the Applicant is the presumed owner. The Applicant has also included in the table the status of engagement with the relevant landowner. Where landowners have indicated a wish to take forward discussions they are in progress. b) This is the same time limit set out in Schedule 1 paragraph 28 of the Model Provisions and the same time period has been used in other made DCOs including The A1 Birtley to Coal House DCO 2021 (Article 32). There is no definitive date for completion of each section of the works. However, the current programmed completion date for the authorised development when it is open to traffic is set for May 2026 and the construction phasing is set out in Chapter 2, The Scheme of the Environmental Statement (based on a reasonable worst case construction programme – Table 2-3) **[APP-071]**. This level of flexibility on timescales is needed to ensure the development is deliverable. The completion date is not secured by any requirement. It would not be in the Applicant's interest to

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unnecessarily delay the completion of construction works. The Applicant will be able to notify those persons when the completion date is and such works will form part of a distinct phase as detailed in Chapter 2 The Scheme **[APP-071]** of the Environmental Statement.

c) The reasons for the exclusions listed in Article 40(4)(a)-(f) of the dDCO **[APP-025]** are to ensure that the Scheme is deliverable without it being compromised by the need to reinstate land to its previous condition when the authorised works referred to are required to deliver the Scheme. Articles 40(4)(a)-(d) have been included in a number of previously made DCOs for highway schemes including The A1 Birtley to Coal House DCO 2021.

As noted in the Explanatory Memorandum **[APP-028]** paragraph 4.1.149(e) the additional exclusions ensure that where a future use of the land could benefit from the use of those works this is made possible. This seeks to reduce unnecessary construction works and the environmental impacts of this. The retention of any temporary works on site can only take place with the relevant landowner's approval.

d) This is for the Affected Persons to comment upon and the Applicant will consider any responses received.

Attachments for the response:

Name	Link	Description
Permanent Works on Temporary Land Table	https://teams.microsoft.com/l/file/E484B3D1-7B9F-4DC4-A496-7A51DCF4EA39?tenantId=70b6b8a3-c1f2-433c-aa07-c096bad5bc8b&fileType=xlsx&objectUrl=https%3A%2F%2Fa428blackcat.sharepoint.com%2Fsites%2FVolume9-ExaminationSubmissionDocuments%2FShared%20Documents%2FGeneral%2FDeadline%201%2F9.2%20Response%20to%20Written%20Questions%2FAttachments%2FQ1.7.3.2.1%20-	

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		%20Permanent%20Works%20on%20Temporary%20Possession%20Plots%2FQ1.7.3.2.1%20-%20Table%20showing%20permanent%20works%20on%20temporary%20possession%20plots.XLSX&baseUrl=https%3A%2F%2Fa428blackcat.sharepoint.com%2Fsites%2FVolume9-ExaminationSubmissionDocuments&serviceName=teams&threadId=19:53ykumEBE7pl11qQWq3ODEhbWwrYAkj3wBGA6qkjCqs1@thread.tacv2&groupId=ab606f9f-5b11-45e7-b79b-2e5f8800dc0f e)
Q1.7.3.22	Applicant	**Question:** **Article 40 – Temporary use of land for carrying out the authorised development and Article 41 – Temporary use of land for maintaining the authorised development** a) Why is the notice period 14 days in Article 40 and 28 days in Article 41, given that both Articles make provision for the undertaker to take temporary possession of land? b) Is 14 days adequate notice for the undertaker to take temporary possession of land? Explain with reasons. c) Do you mean paragraph (6) rather than paragraph (5) in EM **[APP-028, paragraph 4.1.152]**? d) Where is "*so long as may be reasonably necessary*" in Article 41(5) determined for all plots effected by this provision? If it is determined by Article 41(13), then where is "*the date on which that part of the authorised development is first opened for use*" determined?

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		Answer: a) The timescales mirror those set out in Schedule 1 paragraph 28 and 29 of the Model Provisions. Article 40 of the dDCO **[APP-025]** only relates to the construction period and the land that is required for temporary possession is set out in Schedule 7 of the dDCO so landowners have been forewarned and have an element of certainty. However, Article 41 of the dDCO applies to a maintenance period of five years from the completion date and may be exercised if access is reasonably required, therefore it is reasonable that more notice should be given to landowners. b) The 14 day period was included in the Model Provisions and numerous other granted development consent orders including The A63 (Castle Street Improvement, Hull) Development Consent Order 2020; The A1 Birtley to Coal House Development Consent Order 2021; The A19 Downhill Lane Junction Development Consent Order 2020; and The A303 Sparkford to Ilchester Dualling Development Consent Order 2021. The 14 day period is therefore considered adequate. Although the notice period of 14 days is less than that envisaged by the Neighbourhood Planning Act 2017 (the provisions of which are not yet in force), the owners and occupiers of the land will have been consulted and notified of the Applicant's need to temporarily use the land to carry out the authorised development as a result of the DCO application process. The Applicant needs to ensure that the Scheme can be carried out efficiently and expeditiously following the making of the Order. Therefore, a longer notice period is considered to be unnecessary given that the relevant landowners will already have had prior notice via consultation. c) Yes, this is correct, the reference should refer to paragraph (6). The Explanatory Memorandum **[APP-028]** will be corrected. d) Article 41(5) of the dDCO **[APP-025]** allows the undertaker to exercise its discretion as to the length of time required but this provision ensures that the undertaker can only remain in possession whilst there is a requirement to do so. Therefore, a definition of "so long as reasonably required" is not set out as the normal interpretation of that phrase should be adopted. The date that each part of the authorised development is first opened is also not defined in the dDCO **[APP-025]** as completion dates are only approximate. The approximate date for opening of the works is May 2026. The wording of Article 41(5) and Article 41(13) was approved in The A19/A184 Testo's Junction Alteration Development Consent Order 2018; and The M20 Junction 10a Development Consent Order 2017.
Q1.7.3.23		**Question:**

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	Applicant Local Highway Authorities	**Article 55 – Traffic regulation** Who will determine the date of "*opening of the authorised development for public use*" referred to in Article 55(3) and (7), and how? Where is this set out and secured? Traffic Authorities to comment?
		Answer: The date that the authorised development is open for public use will be a question of fact and degree. However, as the Applicant will be opening the authorised development and allowing public use, they will be best placed to determine when this has occurred. Given it is a question of fact and degree, it does not need to be, nor can it be, secured within the dDCO **[APP-025]** at this stage. As set out in paragraph 4.1.197 of the Explanatory Memorandum **[APP-028]** this provision has wide precedent across many Highways England orders.
Q1.7.3.24	Applicant Environment Agency	**Question:** **Article 58 – Works in the River Great Ouse** a) Why are there word in brackets () in Article 58(1) and (2)? b) Does the EA have any comments on the provisions of Article 58?
		Answer: a) We have amended the drafting and removed the brackets within Article 58. This amendment has been captured in the updated dDCO **[APP-025]** submitted at Deadline 1.
Q1.7.3.25	Applicant	**Question:** **Article 59 – The Cadent Diversion Works** Submit Article 4 of the Hinkley Point C (Nuclear Generating Station) Order 2013. Describe briefly the specific circumstances for the Hinkley Point C project to give context to the relevant provisions in Article 4 of the order.

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		Answer: Article 4 of the Hinkley Point C (Nuclear Generating Station) Order 2013 (Hinkley NGS Order) is set out below: *Effect of the Order on the site preparation permission* *4.—(1) If the undertaker serves a notice on West Somerset District Council under this article—* *(a)the undertaker shall cease to carry out development under the site preparation permission; and* *(b)the conditions of the site preparation permission shall cease to have effect, except for Conditions G4, R1, R2, R3, R4, R5 and R6.* *(2) The undertaker may not carry out Work No. 1A under this Order until notice has been served under paragraph (1).* *(3) Notwithstanding paragraph (2), the undertaker may exercise any other powers under this Order in respect of any part of the authorised project prior to or following service of notice under paragraph (1).* *(4) Without prejudice to the generality of paragraph (3), the undertaker may discharge any requirement at any time prior to or following the service of notice under paragraph (1).* *(5) Where details, plans or any other matters have been approved or agreed by West Somerset District Council pursuant to a condition of the site preparation permission in column (1) of Schedule 3 prior to the date on which the undertaker serves notice under paragraph (1) they shall be deemed to have been approved for the purpose of the corresponding requirement in column (2) of Schedule 3.* The Hinkley Point C project sought separate planning permission for its site preparation works by way of the 'site preparation permission' as defined in the Hinkley NGS Order as *"the planning permission in respect of land to the West of Hinkley Point, Stogursey, Bridgwater TA5 1TP granted by West Somerset District Council on 27th January 2012, with reference number 3/32/10/037"*. The purpose of Article 4 within the Hinkley NGS Order was to allow the site preparation works to be carried out under the 'site preparation permission' or if the works were not completed by the time the Hinkley NGS Order was made then the Applicant could, upon providing notice, carry out the site preparation works using the made Hinkley NGS Order.
Q1.7.3.26	Applicant	**Question:** **Article 60 – Use of private roads for construction**

No.	Directed to	Question
		Given the similarity between Article 60 and temporary possession rights in Article 40, should there be a schedule, similar to Schedule 7, for all private roads likely to the be affected by this provision. Explain with reasons.
		Answer: Article 60 of the dDCO **[APP-025]** allows the Applicant to use any private road within the Order limits for the passage of persons or vehicles (with or without materials, plant and machinery) for the purposes of, or in connection with, the construction of the authorised development. The Applicant must compensate the person liable for repairs to such a road for any loss or damage suffered by that person. There will be parts of almost all private roads and access tracks within the Order limits that will be crossed or where short sections will be used as part of the construction works for the Scheme. There are also sections of the private roads/access tracks that will be altered and realigned as part of the main works/accommodation works for the Scheme. Where farmers or landowners require access across the track to allow them to farm or maintain their fields the Applicant will liaise with those owners / occupiers to ensure arrangements can be made. Given that Article 60 applies to all private roads within the Order limits it is not necessary to list them within the Order. Further the Applicant notes that previously made Orders containing this provision do not include a schedule identifying the private roads to which they relate. Please see paragraph 4.1.212 of the Explanatory Memorandum **[APP-028]** for the specific Orders.
Q1.7.3.27	Applicant	**Additional Question:** **Article 9(1) – Limits of deviation** Justification for the range in limits of horizontal deviation in the Works Plans **[APP-009 and APP-010]**, which appears to extend up to 100m in Composite Sheets 4,5,6,8,10 and 11.
		Answer: The areas of deviation shown on sheets 4, 5, 6, 8, 10 and 11 of the Works Plans **[APP-009** and **APP-010]** are designated for proposed native woodland planting or proposed grassland. The approach taken to setting the limits of deviation for the Scheme was to follow the permanent land take proposed. This means that for the sheets mentioned there appears to be an extension to the limits of deviation.

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		However, for the reasons given in response to Q1.7.3.7 above, in practice it is unlikely that the limits of deviation specifically referred to on the sheets noted will be utilised for highway works or any use other than the landscaping uses noted above.
Q1.7.3.28	Applicant	**Additional Question:** **Article 28 – Compulsory acquisition of rights and imposition of restrictive covenants** a) As drafted, Article 28 seems to allow rights to be created over any of the Order land, and not limited to the plots listed in Schedule 5. Applicant to explain, if the broad scope of Article 28 (1) coupled with the lack of any statement in the EM, to the effect that Article 28 only applies to the Order land listed in Schedule 5, could mean that the undertaker would have an unrestricted right to impose undefined new rights over any of the Order land, not just the plots listed in Schedule 5, and including over land for Temporary Possession only? b) Does Article 28 it require clarity that it only applies to the plots listed in Schedule 5? c) Or if undefined rights are sought on land not listed in Schedule 5, then should this intent be clearly identified and the need for it justified in the Explanatory Memorandum and Statement of Reasons? d) Describe the information used as the basis for consultation with persons with an interest in the Order land.
		Answer: a) b) & c) For the reasons set out in response to Q1.7.3.20 the provisions of Article 28 do not just apply to the land identified in the dDCO **[APP-025]** in Schedule 5. The provisions are explained in the Explanatory Memorandum **[APP-028]** in paragraph 4.1.107 stating that the public benefit is to allow the undertaker, if possible, to reduce the extent of permanent acquisition and rely on rights instead. It is also addressed in paragraph 3.2.1 in the Statement of Reasons **[APP-030]**. It is not possible to acquire new rights over land authorised for Temporary possession only That is because Article 40(1)(a) authorises the temporary possession of land which is identified in Schedule 7 and can only be used as such (Article 40(1)(a)(i)) (as shown coloured green on the land plans) or other land where no notice to treat has been served (Article 40(1)(a)(ii)). That is for land which is land authorised for permanent acquisition under Article 25 or the acquisition of new rights under Article 28 but no notice to treat has been served. Article 40(9) has an express restriction on the permanent compulsory acquisition of land if it is authorised for temporary possession only (under Article 40(1)(a)(i)) but it does permit acquiring new rights over that land if those new rights are authorised

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		under Article 28 but because of both Article 40(1)(a)(i) and Article 40(9)(a) it is not possible to acquire new rights over that temporary possession land unless that land is also listed in Schedule 5. d) all persons in the Book of Reference have been consulted. A diligent land referencing process was undertaken on the land at the formal consultation stage and then at the supplementary consultation stage. Any minor changes that were then incorporated into the limits ahead of the application were again consulted on with those parties directly affected. Whilst there is the ability in the dDCO **[APP-025]** to reduce the permanent acquisition of land and replace this instead with the acquisition of rights none is currently anticipated. Any minor changes which were addressed ahead of the application were changing from temporary rights only to either permanent new rights or acquisition of freehold. A description and explanation of the change along with an accompanying plan were sent directly to those parties affected.
Q1.7.3.29	Applicant	**Additional Question:** **Article 40 – Temporary use of land for carrying out the authorised development** a) Provide justification and explanation of Article 40(9)(a), if it allows the creation of permanent rights under Article 28(1) over land which is intended for Temporary Possession alone. b) Describe with evidence if persons with an interest in that land have been consulted on the basis that their land is sought for Temporary Possession but the Applicant has the ability to create undefined new rights over this land (identify in the Statement of Reasons, Book of Reference and the Land Plans).
		Answer: a) For the reasons set out in the response to Q1.7.3.20 and Q1.7.3.28 it is not possible to acquire new permanent rights over land identified in Schedule 7 of the dDCO **[APP-025]** for temporary possession powers only. However, it is possible to exercise both (i) temporary possession powers over land and (ii) the acquisition of new rights over that land if it is identified for the acquisition of new rights in Schedule 5 of the dDCO. b) Land owners have been consulted on the basis that their land may be required for (i) permanent acquisition, (ii) acquisition of new rights which can also include temporary possession prior to exercising the permanent acquisition of new rights, or (iii) temporary possession only. These land parcels are all clearly identified on the land plans as either pink, blue or green in that order and the corresponding parcels identified in the Book of Reference **[APP-032]**. It is Schedule 7 of the dDCO **[APP-025]** which expressly limits land to temporary

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		possession powers only. The justification for temporary possession is set out in section 3.4 of the Statement of Reasons **[APP-030]**.
Q1.7.4	**Schedules**	
Q1.7.4.1	Applicant	**Question:** **Schedule 1** The EM states that the Applicant has chosen not to differentiate the NSIP and associated development works in Schedule 1 to the Order **[APP-028, paragraphs 2.1.24, 2.1.25]**. a) Justify then then inclusion of 'further associated development within the Order limits' listed in paragraphs (a) – (u). b) In line with the position stated in the EM, why have specific instances of works listed in paragraphs (a) – (u) not been identified with works numbers in the works plans and Schedule 1? c) Do all the works listed in the paragraphs (a) – (u) meet the Guidance on associated development issued by the Secretary of State for Communities and Local Government? d) The ExA finds that many of the works described in paragraphs (a) – (u) could give the undertaker powers to do any works within the order limits, potentially making redundant the more specific, tightly defined, and controlled provisions within the dDCO. Explain giving reasons why this is necessary. For instance, do the powers in (a) give much wider powers than the provisions in Article 16 and 17?
		Answer: a) The use of the list of further associated development within the dDCO **[APP-025]** is an approach adopted by many made Orders as set out in paragraph 2.1.25 of the Explanatory Memorandum. The approach ensures that the dDCO contains the necessary powers for all the works required to carry out the Authorised Development without resulting in a more complicated and repetitive Works Description in Schedule 1. b) As can be seen by the Works Descriptions of highway schemes to date, the level of detail is significant and as such the Works Descriptions can become very complicated. Using the further list at the end of the Works Descriptions also ensures the authorised development can be constructed efficiently and without impediment.

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		Given the nature of a highways scheme and the complex nature of the works it is appropriate that the description of the numbered works does not list every minor work that could be carried out in connection with them. To do so would result in an overly repetitive list of works and would arguably also need to show this detail on the works plans when some of the elements in the list of further associated development are subject to more detailed design. c) The Applicant is of the view that all of the works listed in paragraphs (a) – (u) in Schedule 1 to the dDCO **[APP-025]** comply with Guidance on associated development issued by the Secretary of State for Communities and Local Government dated April 2013. d) The first point to note is that the list of powers in paragraph (a) – (u) are limited by the sentence proceeding the list which makes it clear that this list of works can only be carried out "in connection with the authorised development… within the Order limits". As such, the ability for the Applicant to carry out any works within the Order limits is limited to the extent that it can be shown that the work is necessary in connection with a numbered work in Schedule 1 to the dDCO **[APP-025]**. In relation to Articles 16 and 17 of the dDCO **[APP-025]**, the Applicant notes the following: • Article 16: the list of activities that the Applicant may carry out under this article are wider than those proposed under paragraph (a) within Schedule 1 to the dDCO **[APP-025]**. Paragraph (a) allows for the following: *(a) alteration to the layout of any street permanently or temporarily, including but not limited to increasing or reducing the width of the carriageway of the street by reducing or increasing the width of any kerb, footpath, footway, cycle track or verge within the street; and altering the level of any such kerb, footpath, footway, cycle track or verge;* • Article 17: this article provides a temporary power to the Applicant to alter, divert, prohibit or restrict the use of any street and does not authorise the Applicant to carry out the permanent works as set out in Schedule 1 to the dDCO **[APP-025]**.
Q1.7.5	**Requirements**	
Q1.7.5.1	Applicant	**Question:** **Requirement 3 – Second Iteration EMP and Requirement 4 – Third Iteration EMP** Explain if Requirements 2 and 3 should state which party (undertaker, contractor, operator) would be responsible for consultation and for seeking the approval.

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		Answer: It is the Applicant's view that such a distinction is not necessary within Requirements 3 and 4 of the dDCO **[APP-025]**. It is for the Applicant as 'undertaker' within the dDCO to ensure that all Requirements are discharged appropriately, and any contractor or operator would only be seeking to discharge Requirements and 4 on behalf of the Applicant.
Q1.7.5.2	Applicant	**Question:** **Requirement 6 – Landscaping** The ExA finds the word 'reasonable' in Requirement 6(4) superfluous. Comment or revise.
		Answer: The use of the word 'reasonable' in this context has precedence in a number of made Orders including The A19 Downhill Lane Junction Development Consent Order 2020, The M42 Junction 6 Development Consent Order 2020 and The A585 Windy Harbour to Skippool Highway Development Consent Order 2020. The inclusion of this term merely indicates that the standard to which the landscaping must be carried out must be reasonable and in accordance with the relevant recommendations of appropriate British Standards or other recognised codes of good practice.
Q1.7.5.3	Applicant	**Question:** **Requirement 11 – Traffic management** The ExA is concerned about the use of the phrase 'substantially in accordance' in Requirement 11. Does this indicate that there could be changes to outline CTMP after Examination, and before commencement? Comment or revise.
		Answer: Inclusion of the phrase 'substantially in accordance' within Requirement 11 sufficiently secures the required elements of the CTMP and, in the Applicant's view, would not enable significant changes to be made to the final CTMP post consent. It is appropriate to allow for the potential for the final document to differ to the certified document given that the outline CTMP has been prepared, at this stage, in outline only. As such it is reasonable to expect that there will be further detail to be provided within the traffic management plan as approved under Requirement 11. It is also reasonable to expect that as the construction detail is refined there may be, for example, additional traffic

No.	Directed to	Question
		management measures which it is agreed should be included based on the final detailed design and construction programme for the Scheme. It is essential that Requirement 11 of the dDCO **[APP-025]** retains this flexibility to accommodate this. Finally, as set out in paragraph 5.1.28 of the Explanatory Memorandum the wording of this Requirement is based on other made Orders which include the phrase 'substantially in accordance'.
Q1.7.5.4	Applicant Local Authorities	**Question:** **Requirement 12 – Detailed design** a) Should this secure the Engineering sections? b) Should this include requirement for design principles and detailed design proposals for structural elements of the Proposed Development, such as bridges, viaduct, gantries, and underpasses, and other fixtures, such as street lighting, signages and railings? c) NPS NN states that design should be an integral consideration from the outset of a proposal, and Applicant should demonstrate how the design process was conducted and how the proposed design evolved. Should this requirement secure such a design development process for elements that are not yet in the Application material? d) LPAs, are there local design policies that would be relevant for the design development process, and design outcomes, particularly in areas that will affect conservation areas and sensitive landscapes? Should the EMP and Requirement 12 make reference to these local design policies? Applicant to comment.
		Answer: a) Requirement 12 does secure the 'engineering section drawings' within Requirement 12(1)(a) of the draft Development Consent Order (dDCO) **[APP-025]**. b) b) The Applicant considers that those elements of the Scheme that will be determined at detailed design, and which will accord with the preliminary scheme design, are sufficiently controlled by regulation and/or standards to negate the need for Requirement 12 to secure any design principles or detailed design proposals for structural elements of the Proposed Development. The information available within the Application is sufficient to judge the potential for likely significant effects to arise as a result of the Scheme design and the relevant parameters are secured in the dDCO.

No.	Directed to	Question
		As stated in the Applicant's response to question Q1.10.1.3 of 9.2 Response to Written Questions, to further assist the ExA in advising the SoS on matters relating to visual appearance and good design, in particular scale, height, massing, alignment, and materials, the Applicant will provide further information on these matters at Deadline 3. c) The Applicant considers that the information available within the Application, as examined during the examination process, will demonstrate that design has been an integral consideration from the outset of the proposals,as well as how the design process was conducted and how the proposed design evolved. In addition to the above, the Applicant considers that those elements of the Scheme that will be determined at detailed design, and which will accord with the preliminary scheme design, are sufficiently controlled by regulation and/or standards to negate the need for Requirement 12 to secure the design development process.
Q1.7.5.5	Applicant	**Question:** **Requirement 16 – Brook Cottages** When would the Method Statement to be prepared by the Archaeological Contractor be available? Is it likely that a draft or outline would be available for Examination?
		Answer: The method statement, described as a Site Specific Written Scheme of Investigation (SSWSI) in the Archaeological Mitigation Strategy **[APP-238]** will be produced after the Development Consent Order is made. The SSWSI will be produced by the Archaeological Contractor. The Archaeological Officer at Bedford Borough Council has also indicated that they will prepare a site-specific brief for the survey, which would be required prior to the production of the SSWSI. Consequently, the draft SSWSI or Method Statement for the recording of Brook Cottage will not be available during Examination.
Q1.7.5.6	Applicant Local Authorities	**Question:** **Requirement 19 – Construction hours** Requirement 19(2) provide widely drawn exceptions to defined construction hours, in particular (k), (m), and (n), which could enable general construction activities. Provide justification. Local Authorities to comment.

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		Answer: We have addressed each element of Requirement 19(2) of the dDCO **[APP-025]** identified in the question below: *k) concrete pours and piling, diaphragm wall works, pavement operations;* There are two main reasons for these works extending outside the usual construction working hours. • Safety - These activities require a series of consecutive operations that need to be completed such that the site can be left in a safe condition. If for example during the normal working hours a plant breakdown or other issue delays the completion of a large diameter pile or diaphragm wall the working hours would be extended to complete the works to reduce the risk of a collapse. • Large Works - Some activities such as large concrete pours for pilecaps, abutments or bridge decks will take more than a single shift to complete. This may be because the rate of concrete placement is controlled such that the works will extend beyond normal working hours and subsequently require a sequence of finishing and protection works which would further extend the shift. *m) works associated with the diversion of existing utilities including the removal of overhead power lines* Works required to divert utilities often require the existing services to be temporarily switched off or suspended while the new route is connected and commissioned. The utility companies who complete these diversions undertake these works in off-peak periods that cause least disruption to their customers and networks. These off-peak periods do not necessarily coincide with the defined construction working hours as they are generally during the night or over weekends. *n) earthworks operations, including excavation, filling, transport, placing and compacting of earthworks materials* Earthworks activities that form a significant element of the early works on highway schemes can only take place in dry weather. Therefore, over the summer period when there is extended daylight and dry conditions it is planned that the earthworks operations will continue outside of normal construction working hours. Over the winter period of November to March earthworks would generally be undertaken within normal working hours. During wet conditions at any time of the year this plant is unable to operate and in that scenario earthworks operations would typically be suspended.
Q1.8	**Diversion of high-pressure pipeline**	

No.	Directed to	Question
Q1.8.1	**Application Material**	
Q1.8.1.1	Applicant	**Question:** **Advance works** In the EM [APP-028, paragraph 2.1.12] and the Pipeline Statement **[APP-248, paragraph 1.1.6]**, states that the excavation of the archaeological remains in the location of the Pipeline diversion, and the Pipeline diversion works themselves, are programmed as 'advance works'. Where is 'advance works' defined in the dDCO?
		Answer: As set out in Section 2 of Chapter 2, The Scheme of the ES **[APP-071]**, 'advanced works' refers to those works which will occur prior to the main construction works for the Scheme. Advanced works can be carried out, either pursuant to the powers in the development consent order, when made, or through permission sought outside of the development consent regime (where the works do not constitute NSIPs in their own right). This term is not used within the dDCO **[APP-025]** because there are no powers or controls within the dDCO that relate specifically to 'advanced works'. Therefore, it is not necessary to define these works within the dDCO. The Applicant is aware that there is a definition for the "advanced works permission" within Article 2 of the dDCO, which specifically relates to the 'advanced works' for the Scheme connected to the Cadent pipeline diversion. It was necessary to include this definition in the dDCO given its use in Article 59 (the Cadent diversion works). This definition does not apply to the broader 'advanced works' as referred to in Chapter 2, The Scheme of the Environmental Statement **[APP-071]**.
Q1.8.1.2	Applicant	**Question:** **Environmental Statement** The ExA notes the Screening Assessment of proposed gas pipeline works for the purposes of section 20 of the Planning Act 2008 **[APP-158, Table 1.1]**. Confirm that the all chapters, figures, appendices and supporting documents of the ES assess the likely effects of the Proposed Development, including the worst case scenario where the diversion of highpressure pipeline would have a significant effect on the environment and be deemed an NSIP in its own right.

No.	Directed to	Question
		Answer: The Applicant refers the ExA to: • Paragraphs 2.6.9 to 2.6.11 of Chapter 2, The Scheme of the Environmental Statement **[APP-071]**, which confirm that the Environmental Impact Assessment of the Scheme has been undertaken on a reasonable worst-case scenario based on a construction programme which includes advanced works (on the assumption that the works are authorised by the application for development consent); and • Paragraph 2.6.31 of Chapter 2, The Scheme of the Environmental Statement **[APP-071]**, which identifies that works associated with diverting the Cadent high-pressure gas main located on the east side of the East Coast Main Line railway would need to be carried out during the phase of Scheme construction that included advanced works (on the assumption that these works are authorised by the application for development consent). Collectively, these paragraphs confirm that the Applicant's Environmental Impact Assessment has fully accounted for the planned diversion works to the Cadent high-pressure gas main, as the construction programme has been used as the basis of the assessments of construction impacts within all topic assessments reported in the Environmental Statement. Furthermore, the Applicant refers the ExA to paragraph 1.3.3 of the Screening Assessment of proposed gas pipeline works for the purposes of section 20 of the Planning Act 2008 **[APP-158]**, which confirms that the Environmental Statement has assessed the likely effects of the Scheme as a whole (which includes the planned diversion works to the Cadent high-pressure gas main on the basis that they will be authorised by the application for development consent). Paragraphs 1.4.1 to 1.4.3 of the Screening Assessment of proposed gas pipeline works for the purposes of section 20 of the Planning Act 2008 **[APP-158]** state that the only factor likely to give rise to significant effects as a result of the Cadent high-pressure gas main diversion is the impact on the high heritage value archaeological remains, and that a planning application for permission to excavate the archaeological remains has been submitted to Central Bedfordshire Council and is currently awaiting determination. The Applicant refers the ExA to its response to Q1.8.4.1 which clarifies that the other phases of the diversion works (i.e. its operation and potential future decommissioning) are unlikely to result in significant environmental effects. Following submission of its Development Consent Order application, the Applicant can confirm that planning consent to undertake excavation of the archaeological remains has been approved by Central Bedfordshire Council and that these works are now being undertaken on site.

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		Once these excavations are completed, the Cadent high-pressure gas main diversion is unlikely to qualify as a Nationally Significant Infrastructure Project. This is because the likely significant effects that result in the diversion meeting the threshold are due to the presence of the buried archaeology. However, as the archaeology is being excavated as part of the advanced works for the Scheme the baseline for the diversion works will be different at the time the diversion works are to be constructed. In any event, the Applicant can confirm that the worst-case assumption of these works being authorised by the application for development consent has been assumed and reported within the Environmental Statement.
Q1.8.1.3	Applicant	**Question:** **Huntingdon to Little Barford gas pipeline** The ExA notes that the ES includes reference to a pipeline in Field 34 **[APP-075, Table 6-4]**. Confirm whether or not this pipeline is part of the high-pressure pipeline to be diverted, which is located in Field 44. Explain how this pipeline has been considered in the ES and the reasons for the seemingly different approach taken than for the high-pressure pipeline, relative to the Proposed Development.
		Answer: The pipeline to be diverted in Field 34, is not the same as the pipeline being diverted in Field 44. The Applicant refers the ExA to: • Paragraph 2.4.37 of Chapter 2, The Scheme of the Environmental Statement **[APP-071]** which describes the National Grid Gas Transmission (NGGT) gas pipeline which 'is located between the River Great Ouse and Barford Road, [and] supplies gas to the power station at Little Barford'. This is the pipeline in Field 34, • Paragraph 2.4.38 of Chapter 2, The Scheme of the Environmental Statement **[APP-071]** which describes 'a further high-pressure gas main operated by Cadent' and carries gas primarily for domestic supplies, which is the pipeline in Field 44. In relation to the environmental assessment of this pipeline, the Applicant refers the ExA to: • Paragraphs 2.6.9 and 2.6.11 of Chapter 2, The Scheme of the Environmental Statement **[APP-071]**, which confirms that the Environmental Impact Assessment of the Scheme has been completed based on a reasonable worst-case scenario (comprising a construction programme which includes advanced works); and

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		• Paragraph 2.6.31 of Chapter 2, The Scheme of the Environmental Statement **[APP-071]**, which identifies that work associated with lowering National Grid (NG) 450NB HP gas main located between River Great Ouse and Barford Road would need to be carried out during the advanced works phase of the Scheme construction. Collectively, these paragraphs confirm that the Applicant's Environmental Impact Assessment has fully accounted for the planned lowering of NG 450NB HP gas main, as the construction programme, including the advanced works, has been used as the basis of the assessment of construction impacts within all topic assessments reported in the Environmental Statement. The reason for the different approach to NG 450NB HP gas main relates to the thresholds set out in section 20 of the Planning Act 2008. The relevant thresholds are: • The construction of a pipeline by a gas transporter is within section 14(1)(f) only if (when constructed) each of the conditions in subsections (2) to (5) is expected to be met in relation to the pipeline. • The pipeline must be wholly or partly in England. • Either (a) the pipeline must be more than 800 millimetres in diameter and more than 40 kilometres in length, or (b) the construction of the pipeline must be likely to have a significant effect on the environment. • The pipeline must have a design operating pressure of more than 7Bar gauge. • The pipeline must convey gas for supply (directly or indirectly) to at least 50,000 customers, or potential customers, of one or more gas suppliers. While the proposed lowering of NG 450NB HP would meet some of the above criteria it does not "*convey gas for supply (directly or indirectly) to at least 50,000 customers, or potential customers, of one or more gas suppliers*". This is because the pipeline serves one customer (Little Barford Power Station) which in turn provides electricity and not gas to its customers. Accordingly, it does not meet the thresholds to qualify as a Nationally Significant Infrastructure Project. The Applicant can also confirm that planning consent to undertake excavation of the archaeological remains within Field 34 has been granted by Central Bedfordshire Council, and that these works have been completed on site along with the lowering of NG 450NB HP gas main, to coincide with maintenance work being undertaken at Little Barford Power Station.
Q1.8.2	**Determining if the pipeline diversion would be an NSIP**	

No.	Directed to	Question
Q1.8.2.1	Applicant	**Question:** **Determining if the pipeline diversion would be an NSIP** Provide in the form of a flowchart, the sequence of events that would need to take place, identifying timescale and parties involved in order to determine if the diversion of the pipeline would be an NSIP?

Answer:

The Applicant has prepared the flowchart that is attached at Appendix 1.8.2.1 of this document.

The flowchart sets out the sequence of events that would need to take place in order to determine if the diversion of the pipeline would be an NSIP.

As shown on the flowchart, the Applicant considers that a screening opinion is required to conclusively determine whether or not the diversion works, should they be carried out in advance of development consent, would meet the thresholds in section 20 of the Planning Act 2008 and would therefore be an NSIP. Based on the current timeline it seems unlikely that Cadent will obtain a screening opinion from the Secretary of State for Business, Energy and Industrial Strategy prior to the close of the Examination for this Scheme. Therefore, the Applicant proposes that the ExA proceed on the basis that the Cadent pipeline diversion is treated as an NSIP for the purposes of making a recommendation on the Scheme to the SoS for Transport (as also explained in Q1.8.2.2 below).

Attachments for the response:

Name	Link	Description
Q1.8.2.1 - Pipeline Diversion NSIP Flowchart	https://teams.microsoft.com/l/file/825DA403-5141-4C34-AFCE-5B1D7FF3D8AB?tenantId=70b6b8a3-c1f2-433c-aa07-c096bad5bc8b&fileType=pdf&objectUrl=https%3A%2F%2Fa428blackcat.sharepoint.com%2Fsites%2FVolume9-ExaminationSubmissionDocu	

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		ments%2FShared%20Documents%2FGeneral%2FDeadline%201%2F9.2%20Response%20to%20Written%20Questions%2FAttachments%2FQ1.8.2.1%20-%20Pipeline%20Diversion%20NSIP%20Flowchart%2FQ1.8.2.1%20-%20Pipeline%20Diversion%20NSIP%20Flowchart.PDF&baseUrl=https%3A%2F%2Fa428blackcat.sharepoint.com%2Fsites%2FVolume9-ExaminationSubmissionDocuments&serviceName=teams&threadId=19:53ykumEBE7pl11qQWq3ODEhbWwrYAkj3wBGA6qkjCqs1@thread.tacv2&groupId=ab606f9f-5b11-45e7-b79b-2e5f8800dc0f
Q1.8.2.2	Applicant	**Question:** **Alternatives** Provide the alternatives (description, process and accompanying plans) currently being considered for the pipeline diversion and alignment, and timing of the diversion works, identifying the alternatives that are likely to be deemed an NSIP and those that would not. The ExA notes that in advance of the Planning Permission that is currently awaited from CBC, this assessment may not be possible, but would like to see any information that would enable the ExA prepare for the Examination of all possible scenarios within the timescales of this Examination.

No.	Directed to	Question
		Answer: The Applicant and Cadent are still developing the detailed design of the alignment for the diversion of the high pressure gas pipeline within the limits of deviation as shown on the Works Plans **[APP-009 – APP-010]** for Work No.51. The nature of the consent required to authorise the diversion will be determined at the point at which Cadent seek a screening opinion from the Secretary of State for Business, Energy and Industrial Strategy (BEIS). If the Secretary of State for BEIS determines that likely significant effects may arise from the diversion in the screening opinion, the diversion will be treated as an NSIP as it will meet the thresholds set out in section 20 of the Planning Act 2008. If the Secretary of State for BEIS determines that likely significant effects do not arise, Cadent would be able to progress the diversion under their permitted development rights. Once the alignment of the diversion has been finalised, and subject to further internal consents, it is anticipated that Cadent will seek a screening opinion to establish whether the diversion can be undertaken under their permitted development rights. As the alignment of the new A428 carriageway for the Scheme affects the archaeological remains in this area, planning permission has been sought, and since granted by Central Bedfordshire Council on 8 April 2021, for archaeological excavation in advance of determination of the application for development consent. Excavation works commenced on 19 July 2021 and are due to be completed by January 2022. As the only likely significant effect of the diversion would be impacts on the archaeological resource, the timing of the Secretary of State's screening opinion and whether this is made before or after completion of the excavation works is likely to be highly relevant to the outcome of the screening decision. It is considered unlikely that the alignment of the diversion will be settled and therefore that a screening opinion will be sought from the Secretary of State until after completion of the archaeological excavation in January 2022, and therefore it is highly unlikely that the diversion works would be undertaken in advance of the close of the Examination. In these circumstances, and until a screening opinion is issued by the Secretary of State which confirms that likely significant effects will not arise as a result of the diversion, the Applicant considers that the diversion should be treated as an NSIP for the purposes of the application for development consent for the Scheme.
Q1.8.2.3	Applicant	**Question:** **Precedence** Provide precedence if it exists, of two NSIPs being determined within a single examination, that relate to two distinct designated NPSs and would be determined by two different Secretaries of State.

No.	Directed to	Question
		Answer: While the Applicant has been unable to locate a precedent of two NSIPs being determined within a single examination, that relate to two distinct designated NPSs, the Department for Transport and the Department for Business, Energy and Industrial Strategy (BEIS) have issued a joint letter dated 30 July 2021 confirming that it has been agreed that the Secretary of State (SoS) for Transport would be the sole decision maker for the Scheme and that the SoS for BEIS will be consulted on the recommendations made by the Examining Authority in relation to the energy NSIP and his comments will be taken into account when the SoS for Transport is making his decision. The letter can be found on the Planning Inspectorates website here: https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2021/08/DfT-BEIS-TR010044-TR010032-Transport-DCOs-with-energy-elements.pdf.
Q1.8.3	**Excavating the archaeological remains**	
Q1.8.3.1	Central Bedfordshire Council Historic England	**Question:** **Planning Permission for excavations** The Applicant has stated that a planning application to excavate archaeological remains has been submitted to CBC **[APP-158, paragraph 1.4.3]**. a) CBC, provide an update on the status of the Planning Application. b) If the Planning application has been determined, provide a summary of conditions. c) CBC, is the Applicant's approach to these excavations in accordance with the Archaeological Mitigation Strategy **[APP-238]**? d) HistE, were you consulted on this application, and if so, what were your views, including with reference to the overall road scheme?
		Answer: No response required from Applicant.
Q1.8.3.2	Applicant	**Question:**

No.	Directed to	Question
		Excavating the archaeological remains a) Applicant, explain what is the purpose of excavating the archaeological remains? b) Assuming planning permission is granted, what are the timescales for completing these excavations, and how would this be controlled? c) Have these excavations been considered in the ES, including any cumulative impact? d) Is there any alignment of the diverted pipeline that would not require the excavation of the archaeological remains?
		Answer: a) The purpose of excavating the archaeological remains is to ensure the site has been fully mitigated in advance of construction activity. The excavation works are required due to the alignment of the new carriageway, irrespective of the final alignment for the Cadent high-pressure gas main. If the archaeological remains were left in situ then they would be damaged by the construction works and the opportunity to understand this aspect of cultural heritage would be lost. b) Planning permission has been granted for work in Field 44, in the location of the Cadent high-pressure gas main. Works started on site in July 2021 and are programmed to run for 25 weeks. The work is being monitored by both the Central Bedfordshire Council Archaeologist and the Project Archaeologist. All works are in line with a Written Scheme of Investigation prepared by the archaeological contractor and agreed by the Central Bedfordshire Council Archaeologist. The work and programme are consented within planning permission (CB/20/04185/FULL). c) Paragraphs 2.6.9 to 2.6.11 of Chapter 2, The Scheme of the Environmental Statement [APP-071] confirm that the Environmental Impact Assessment of the Scheme has been undertaken on a reasonable worst-case scenario and paragraph 2.6.31 identifies that works associated with diverting the Cadent high-pressure gas main diversion would need to be carried out during the advanced works phase of Scheme construction. Collectively, these paragraphs confirm that the Applicant's Environmental Impact Assessment has fully accounted for the planned diversion works to the Cadent high-pressure gas main. In any event, the excavation works are required due to the alignment of the new carriageway, irrespective of the final alignment for the Cadent high-pressure gas main. Following submission of its Development Consent Order application, the Applicant can confirm that planning consent to undertake excavation of the archaeological remains has been approved by Central Bedfordshire Council and that these works are now being undertaken on site.

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		d) Further detail on the assessment process for the Cadent high-pressure gas main can be seen in the response to Question 1.8.1.2. e) No, not without significant realignment of the overall Scheme. On the east side of the East Coast mainline there is no location that would avoid the archaeological site. A diversion to the west would entail two crossings of the East Coast mainline. Even if the Cadent high-pressure gas main diversion could be aligned to avoid the archaeological remains, their excavation would still be required because the alignment of the new carriageway for the Scheme affects the same area of archaeological remains.
Q1.8.4	**Environmental Effects**	
Q1.8.4.1	Applicant	**Question:** **Construction, operation and decommissioning effects** a) If the pipeline diversion were deemed to be an NSIP, would it be relevant to provide an assessment of the construction, operation and decommissioning effects (in addition to the Screening Assessment **[APP-158]**) for Examination? Explain with reasons. b) Should this be required, when can the Applicant make this assessment available for Examination?
		Answer: a) The Applicant can confirm that the purpose of the Screening Assessment **[APP-158]** was to determine whether the Cadent high-pressure gas main diversion would give rise to likely significant effects, in order to establish whether the diversion qualified as a Nationally Significant Infrastructure Project. The Screening Assessment **[APP-158]** concluded that construction associated with the diverted section of the pipeline would be the only element of the works that would result in significant environmental effects, and that these effects would only relate to the loss of high value buried archaeological remains. In the event that the high-pressure gas pipeline diversion was deemed to be a Nationally Significant Infrastructure Project, it is the Applicant's view that it would not be necessary to provide a separate assessment of the environmental effects of its construction, operation and decommissioning because: • The construction effects of the diversion works have already been considered as an integral component of the overall construction phase of the Scheme, and themselves represent a small, localised section of diversion to what is a much larger length of existing pipeline infrastructure. The Applicant refers the ExA to its response to

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		Q1.8.1.2 for further details of how these works have been factored into the Environmental Impact Assessment of the Scheme in totality. • Following construction, the diverted section of the pipeline would be buried and would be highly unlikely to result in significant environmental effects during its operation. • Works associated with pipeline decommissioning, if required at a future point in time, would likely involve similar localised activities to those carried out during construction of the diverted section of the buried pipeline. As the trigger for the pipeline diversion qualifying as a Nationally Significant Infrastructure Project only relates to a significant effect on high value buried archaeology, and given these resources would be removed as part of the diversion works, these resources would not be present at the time of decommissioning and therefore no significant effects are likely. A separate screening assessment would, however, be undertaken by the pipeline operator under the regulations in force at the time of decommissioning to confirm whether the activities associated with decommissioning (for example flushing, filling and sealing the pipeline *in situ* and restoring any disturbed areas of land) would be likely to give rise to significant environmental effects. b) For the reasons set out in part a), the Applicant does not believe a further assessment of the construction, operational and decommissioning effects of the pipeline diversion is necessary.
Q1.8.4.2	Applicant	**Question:** **Other assessments** Would other assessments be required to demonstrate compliance with policy requirements in NPS EN-1 and NPS EN-4, such as Health and Safety and Major Accidents, as well as any legislative requirements?
		Answer: The Applicant has prepared NPS EN-1 and EN-4 Accordance Tables. They are within Appendix B in the Case for the Scheme **[APP-240]**, starting at page 200. Paragraph A2.1.4 of Appendix B explains that these tables only contain details of matters which are considered relevant to the Cadent diversion, and which are not otherwise directly reflected in the NPSNN. Row 4.11 of the NPS EN-1 table in Appendix B (page B-8) explains that the proposed utility works are not subject to the Control of Major Accidents Hazards Regulations 2015. Furthermore, Row 2.19.6 of the NPS EN-4 table in Appendix B (page B15-B16) sets out that the proposed pipeline diversion will be designed in accordance with relevant standards to ensure that risks are as low as reasonably practicable. This includes Institution of Gas Engineers &

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		Managers' (IGEM's) TD/1 Edition 5, which will be the basis of the design of the gas main diversion. TD/1 includes an assessment process that demonstrates the risks are as low as reasonably possible (ALARP). In addition, Cadent designers and contractors work in accordance with a live data base of Policies, Standards, Specifications, Codes and Procedures that are constantly updated to reflect current best practice for all works on Cadent assets. Therefore, there has been no need to engage with the HSE or undertake a gap analysis. On this basis, no further response is needed in respect of this matter. Safety is also addressed in Row 4.61 of Appendix A **[APP-240]**, pages A23-A24. The Application document, Major Accidents and Disasters Screening **[APP-156]**, provides, in Table 1-1, a screening and scoping of major events relevant to the Scheme, identifying relevant legislation and policy. The Applicant concludes that no further assessments are required to demonstrate compliance with policy requirements in NPS EN-1 and NPS EN-4, such as Health and Safety and Major Accidents or any legislative requirements.
Q1.9	**Flood Risk**	
Q1.9.1	**Sequential approach to route selection and design**	
Q1.9.1.1	Applicant Environment Agency	**Question:** **General** Part of the Proposed Development would be located in Flood Zones 3a and 3b near to the River Great Ouse. Consequently, the scheme must pass the flood risk Exception Test. As essential infrastructure the scheme must also be designed and constructed to be operational and safe for users in time of flood and, should result in no net loss of floodplain storage and should not impede water flow (NPS NN, paragraphs 5.90 – 5.115) a) How was a sequential approach to flood risk used in determining the preferred route /junction design? b) For both Construction and Operational phases, have all reasonable opportunities to protect and promote biodiversity as part of scheme drainage and flood risk management been taken? c) EA, comment on the Applicant's approach.
		Answer:

No.	Directed to	Question
		a) In accordance with the sequential approach, the alignment of the preferred route of the new dual carriageway and its associated junction designs have been based upon developing an option that results in the least impact on the River Great Ouse floodplain. The alignment of the new dual carriageway has been designed to cross the River Great Ouse using the lowest crossing length as possible, and a viaduct solution was incorporated into the design to reduce the impact of embankments located within the River Great Ouse floodplain. This sequential approach, alongside the flood mitigation measures incorporated into the design of the Scheme, was applied to ensure that: road users are safe; there is no net floodplain storage loss; and water flows restrictions are minimised. It should also be noted that Paragraph 5.10.22 of the Case for the Scheme **[APP-247]** sets out that the location for the Scheme is dictated by the need to construct a new dual carriageway from west of the A421/A1 Black Cat roundabout through to east of the A428/A1198 Caxton Gibbet roundabout of a suitable standard to form part of the Strategic Road Network. Given that flood plain associated with the River Great Ouse, Hen Brook and other ordinary watercourses lie between the fixed start and end points of the Scheme, the need for the Scheme to cross land that falls within Flood Zones 2 and 3 is unavoidable, and therefore the Scheme accords with NPSNN paragraph 5.105 and passes the Sequential Test as per the requirements of paragraph 5.98 of the NPSNN. b) The Applicant has identified a number of biodiversity promotion opportunities as part of the design-development and flood modelling processes for the Scheme operation. Opportunities to protect existing biodiversity has been identified when establishing the approach to Scheme construction and through the development of appropriate environmental control measures to be implemented during the works. Harnessing and securing these opportunities can be demonstrated and evidenced by the following example measures that have been either incorporated into the Scheme's drainage design, or are presented within the Water Framework Directive Assessment **[APP-217]** and the First Iteration Environmental Management Plan **[APP-234]**: • The use of a clear span crossing over the River Great Ouse to minimise disruption to aquatic habitats and species. • Sensitive designing of culvert structures to maintain ecological continuum, ensure that there is no deterioration against Water Framework Directive objectives, and allowing mammals to safely pass beneath the new dual carriageway through the provision of ledges.

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		• Inclusion of sustainable drainage features (for example ponds and swales), designed to mimic natural drainage as far as practicable, which would provide other benefits in relation to ecological habitat creation. • Provision of new ditch courses which have a primary function as highways runoff treatment, however also provide biodiversity enhancement. • A commitment to undertaking further ecological and geomorphological surveys and assessments at the detailed design stage, the objectives of which would be to: design land drainage ditches to avoid being overly uniform and incorporate sustainable features and planting to maximise biodiversity benefits; and identify opportunities to create pocket wetlands or similar habitats at over-wide land drainage ditches. • Significant lengths of watercourse have been identified within the Order Limits for potential riparian enhancement, for example in the River Great Ouse catchment (i.e. Gallow Brook and smaller tributaries), Hen Brook (including Wintringham Brook and Fox Brook) and West Brook. • Implementation of standard best practice management, prevention and control methods during construction of the Scheme, for example when working in or near watercourses and in floodplains, to minimise potential pollution risks to habitats and species. • Future maintenance activities on new drainage ditches linking treatment ponds to the existing watercourse network are to take into account the biodiversity objectives of channels. • Accordingly, the Applicant believes all reasonable opportunities to protect and promote biodiversity have been identified as part of the drainage design and approach to managing flood risk.
Q1.9.1.2	Applicant Environment Agency	**Additional Question:** **Flood Risk** a) What are the implications of the Government's climate change allowances for flood risk, published on 27 July 2021, for the Proposed Development? b) Does the submitted Flood Risk Assessment (FRA) need to be updated in light of these climate change allowances and if so what would be the timescale for such an update? c) If the FRA needs to be updated, would this be likely to change the conclusions in the ES?
		Answer:

No.	Directed to	Question
		a) There would be no negative impact on the Proposed Development because of the Government's climate change allowances for flood risk published on 27 July 2021. The Flood Risk Assessment **[APP-221]** used the Climate Change Allowances (CCA) that were the most up to date at the time of assessment, published in 2016. Two allowances were used within the Scheme assessment. The 'Higher Central' allowance of 35% was used for the Scheme design, including flood compensation storage. And the 'Upper End' allowance of 65% was applied to check that the Scheme would be robust in the event of more extreme climate change. The Government's CCA for flood risk published on 27 July 2021 for the Anglian River Basin District are 30% for the Higher Central and 58% for the Upper allowances. The CCA have reduced compared to those applied within the Flood Risk Assessment. Overall, based on a review of the new and updated Climate Change guidance, the allowances applied within the Flood Risk Assessment **[APP-221**] are considered conservative. It is anticipated that no increase to the Scheme design will be required by the Applicant to facilitate the Government allowances, and therefore the Flood Risk Assessment remains valid and will not change assessment conclusions. b) The change in the Government CCA would not impact the flood risk assessments conclusions and therefore no update to the flood risk assessment is proposed. c) As previously stated, conclusions within the Flood Risk Assessment for the Scheme remain valid, and therefore no changes to the conclusions of the ES are anticipated.
Q1.9.2	**Interactions between different sources of flooding**	
Q1.9.2.1	Applicant Environment Agency Local Authorities	**Question:** **Grade separated junctions** Has there been an assessment of the interactions between groundwater and surface water at the three grade separated junctions, the various underpasses and culverts, and, any geographical low points?
		Answer: Based on the Scheme design and in relation to the hydrogeological and hydrological settings of the area within the Order Limits, the interaction between groundwater and surface water is only likely to be altered/interrupted in areas of the Scheme/elements of the Scheme where groundwater control and management measures are required during construction and/or operation, particularly in areas of potential deep excavations such as cuttings and borrow pits that are in proximity to surface water bodies.

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		The Applicant can confirm that the assessment included the three grade-separated junctions and underpasses. As other components of the Scheme, for example culverts, are unlikely to result in any significant alteration of groundwater flows or levels, these were not assessed. These areas have been identified, and the assessment has considered the alterations of groundwater flow pattern/regime and flow direction, and interactions with surface water bodies, as a result of the construction and operation of the Scheme. The findings of these assessments are reported in the following paragraphs within Chapter 13, Road Drainage and the Water Environment **[APP-082]** of the Environmental Statement: • Paragraphs 13.9.4-10 consider the risk to the surface water quality of local watercourses from construction runoff that may be contaminated with high loads of suspended fine sediment or other chemical pollutants (e.g. oils). This includes the risk of dewatering excavations during construction. • Paragraphs 13.9.12-37 present an assessment of the effects of dewatering of deep excavations on groundwater levels and flows during the construction phase. This includes the A1 Underpass, Barford Road Cutting and the Alington Hill cutting, and borrow pits near the Black Cat Junction. Although there may be some minor local dewatering from excavations across the project, these are not significant, and no detailed assessment was considered necessary. • Paragraphs 13.9.45-57 present an impact assessment of dewatering from the deep excavations (i.e. major cuttings and borrow pits) on the hydromorphology of receiving watercourses including South Brook and Rockham Ditch. • Paragraphs 13.9.70-75 provide an assessment of the potential risks from groundwater flooding during construction. • Paragraphs 13.9.118-123 provide a worst-case assessment of the risk of permanent dewatering from the deeper excavations associated with the Scheme during the longer-term following construction. This impact is only relevant to the A1 Underpass. • Paragraphs 13.9.144-146 provide an assessment of the potential risks from groundwater flooding during the longer term with the Scheme once constructed. Based on the above, the magnitude of impacts on groundwater-surface water interactions at these locations for both construction (temporary impacts) and operational (permanent impacts) phases, have been assessed to be no more than minor, resulting in adverse effects that are not significant.

No.	Directed to	Question
Q1.9.2.2	Applicant	**Question:** **Black Cat Quarry** Provide an update regarding the expected completion of the restoration of Black Cat Quarry, and an explanation of the implications of a delay to the quarry restoration works for the Proposed Development in terms of flooding and other relevant aspects.
		Answer: The Applicant expects that all restoration works at Black Cat Quarry will be completed before the expiry date of the temporary planning permission for the quarry, which is 7 October 2022, as set out in Bedford Borough Council's application reference: 15/02551/EIAWM. The Applicant can confirm that the Environmental Impact Assessment of the Scheme has been undertaken based on the assumption that operations at Black Cat Quarry are completed and the site fully restored by the time of the commencement of Scheme construction. The Applicant refers the Panel to paragraph 3.3.6 of the Case for the Scheme, **[APP-240]**. This clarifies that the environmental assessments undertaken have assumed the approved quarry restoration scheme to comprise the future baseline conditions within which the Scheme would be constructed. This approach was discussed in a meeting with officers from both Bedfordshire Borough Council and Central Bedfordshire Council in March 2020, at which it was agreed that the restored quarry proposals should represent the baseline conditions for the Environmental Impact Assessment. In the context of flood risk, the Applicant has been reviewing current finished levels (existing) in the quarry and through consultation with the Environment Agency has been providing further information on the potential effect to flood risk in the wider area. In relation to other aspects, the Applicant can confirm that for the other topic assessments considered in the Environmental Impact Assessment, there would be no implications for these reported assessments as they have considered a worst-case baseline of Black Cat Quarry being fully restored, which would result in the greatest environmental impact in terms of landscape and habitat losses.
Q1.9.3	**Passing the Exception Test**	

No.	Directed to	Question
Q1.9.3.1	Applicant	**Question:** **Exception Test** To pass the Exception Test the proposed scheme must demonstrate that it provides wider sustainability benefits to the community that outweigh flood risks; and, that it will be safe for its lifetime, without increasing the risk of flooding elsewhere and where possible will reduce flood risk overall (NPS NN, paragraph 5.108). a) Please identify the wider sustainability benefits of the Proposed Development to the community in terms of the Exception Test. b) Please explain why the Proposed Development's classification as an NSIP would satisfy the wider sustainability benefits to the community part of the Exception Test **[APP-220, paragraph 10.5.5]**.
		Answer: a) Paragraphs 5.10.23 and 5.10.24 of the Case for the Scheme **[APP-240]** set out the requirements of the Exception Test in the National Policy Statement for National Networks (NPS NN) and how the Scheme passes the test. The wider sustainability benefits to the community are set out as being the "substantial public benefit" of the Scheme which are considered in detail in Chapter 4 of the Case for the Scheme **[APP-240]**. Footnote 95 of the NPS NN sets out that the wider sustainability benefits would include the benefits (including need) for the infrastructure. In summary these are network safety, reduced congestion and journey time delay and economic growth. Further to this, the Scheme also delivers an increase in biodiversity net gain of approximately 20.5% through the creation of wetlands, small pockets of habitat related to the drainage, and restoring habitat riparian to the sections of brooks crossed by the Scheme. These measures provide the "wider sustainability benefits" to the community in terms of the Exception Test. b) The Scheme provides a safer national infrastructure that ensures: users are not affected by flooding from rivers such as the River Great Ouse; protects watercourses by providing sustainable drainage attenuation from permeable surfaces; there is no net floodplain storage loss; and watercourse flows restrictions are minimized. The above flood protections, as set out in the Assessments documents **[APP-219], [APP-220], [APP221**] and **[APP-222]**, are why this NSIP is considered to satisfy the Exception test in terms of benefits to the wider community flood risk and associated safety.
Q1.9.4	**Climate Change resilience**	

No.	Directed to	Question
Q1.9.4.1	Applicant Environment Agency	**Question:** **Climate Change** a) Given the 60-year life of the scheme, has the correct CCA for the Anglian River Basin District been used, including in the Flood Risk Assessments **[APP-221] [APP-222]** and in the dDCO **[APP-025]**? b) Why is the River Great Ouse subject to a lower CCA than the ordinary watercourses?
		Answer: a) The climate change allowance that have been assessed for the Scheme watercourses and reflected in the Flood Risk Assessments **[APP-221], [APP- 2222]** and the dDCO **[APP-025]** are based on the potential change anticipated for the 2080s (2070 to 2115). Given that the time frame for the CCA covers more than 60 years, the design life span of a highway, then the allowances are considered adequate for the Scheme life span. b) The River Great Ouse and Ordinary Watercourses (with catchments over 5km^2) have used the same CCA, as indicated in the flood Risk Assessments **[APP-221]** and **[APP- 222]**. Where an ordinary watercourse has a smaller upstream catchment then the EA recommended CCA is 20% design and 40% design check. The River Great Ouse and Ordinary Watercourses, as discussed above, have used the Environment Agency (EA) website guidance CCA for river flows, as indicated at the time of the application, namely, a 35% Higher Central design allowance and a 65% Upper design check allowance design for the Anglian River Basin District. Flood compensation was also based on a 35% CCA in accordance with the EA guidance. Current EA website river flow guidance shows that the river flow CCA for this district is now lower at 30% and 58% for the respective Higher Central and Upper allowances. The CCA used in the Flood Risk Assessments **[APP-221]** and **[APP- 222]** are therefore considered a conservative approach.
Q1.9.4.2	Environment Agency Cambridgeshire County Council Bedford Borough Council	**Question:** **Flood Risk and Pollution Control** a) With reference to the Exception Test, does the FRA demonstrate that the project will be safe for its lifetime, without increasing flood risk elsewhere (NPS NN, paragraphs 5.90 5.115)? b) Will the users of the Proposed Development remain safe in time of flood, even when climate change is

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	Central Bedfordshire Council	considered? c) Will the River Great Ouse replacement floodplain storage be adequate, including with regard to the ongoing quarry restoration works? d) Have all sources of flooding been adequately considered in this assessment, including in-combination effects and the likely effects of climate change? e) Have all reasonable opportunities been taken to reduce overall flood risk as part of the Proposed Development? f) Are the proposed pollution control mechanisms sufficient to protect the environment, including with regard to Climate Change?
		Answer: No response required from Applicant.
Q1.10	**Good Design**	
Q1.10.1	**Visual appearance and design principles**	
Q1.10.1.1	Applicant	**Question:** **Visual appearance** a) When is it proposed to produce design proposals for structural elements of the Proposed Development, such as bridges, viaduct, gantries, and underpasses, and other fixtures, such as street lighting, signages and railings? b) Is it likely to be submitted to Examination? c) How can the ExA advise the SoS on matters relating to visual appearance, in particular scale, height, massing, alignment, and materials in the absence of this information (NPS NN, paragraphs 4.28 – 4.35)?
		Answer: a) The Applicant has provided the preliminary design proposals for the bridges, viaduct and underpasses in the Engineering Sections (Part 3 – Structures General Arrangements) **[APP-019]**. The proposals for signage, lighting

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		and railings are not currently available, however will be progressed through the detailed design stage of scheme development, which will be post consent of the Application. b) The Applicant is working up design principles that will be submitted into Examination at a future deadline. . It is currently not likely that detailed design proposals for bridges, viaduct, gantries, underpasses and other fixtures, such as street lighting, signages and railings will be available to be submitted into the Examination. c) Paragraph 4.34 of the NPSNN recognises that applicants may only have limited choice in the physical appearance of some national networks infrastructure. Whilst the development of and on the Strategic Road Network needs to adhere to standards set out in the Design Manual for Roads and Bridges, every effort has been made to ensure that good design principles are embedded into the design development of the Scheme. Highways England's publication "The road to good design" contains a series of principles for good road design which are centred on the themes of connecting people, places and processes. This states that good road design: • Makes roads safe and useful. • Is inclusive. • Makes roads understandable. • Fits in context. • Is restrained. • Is environmentally sustainable. • Is thorough. • Is innovative. • Is collaborative. • Is long-lasting. The design-development of the Scheme has been underpinned by these ten principles, which collectively have encouraged better design and helped provide a basis for the Scheme to be objectively reviewed at key stages of its development. Matters relating to scale, height, massing and alignment of the Scheme have been considered in the design development and environmental impact assessment of the scheme. For example, the design of the new

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		Black Cat junction was changed to minimise adverse effects relating to the height of the structures. This was done by lowering the A1 north south section. The Environmental Masterplan **[APP-091]** which forms part of the Environmental Statement illustrates the form and location of design-based features embedded into the Scheme, the development of which has been primarily driven by the process of landscape design using guidance contained in LD 117: Landscape Design (Revision 0). It should be noted that Requirement 12 of the draft DCO **[APP-025]** sets out that the detailed design of the Scheme must accord with the principles set out in the Environmental Masterplan. This will ensure that the design principles embedded in the Environmental Masterplan will be carried through to the detailed design stage of the Scheme. The Applicant considers that the information available within the Application is sufficient to judge the potential for likely significant impacts to arise as a result of the Scheme design. The Applicant in response to the comments raised by the ExA at the Issue Specific Hearing is considering the extent to which further information on the progress towards detailed design can be provided.
Q1.10.1.2	Applicant Local Authorities	**Question:** **Design principles for the Proposed Development** The ExA has seen the alternatives considered for different types of bridges in the ES **[APP-072, Table 3-3]**, and finds that the accompanying design appraisal is an early stage assessment of structural typologies, and only for one structural element (bridges) in the Proposed Development. We understand that the Applicant cannot provide detailed design proposals at this stage, however, would it be reasonable to set out design principles (other than HE's design principles **[APP-071, Section 2.2]**) for Examination, and to be secured in the dDCO? [NPS NN paragraph 4.28 – 4.35]
		Answer: The Applicant's Case for the Scheme [APP-240], Appendix A, explains how the Scheme is in compliance with the various parts of the National Policy Statement for National Networks (NPS NN). Rows 4.28 to 4.29; 4.33; 4.34; and 4.35 provide details in relation to "good design". It is correct that the Applicant cannot provide detailed design proposals at this stage. It is recognised in Paragraph 4.34 of the NPSNN that applicants may only have limited choice in the physical appearance of some national networks infrastructure. Whilst the development of and on the Strategic Road Network

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		needs to adhere to standards set out in the Design Manual for Roads and Bridges, every effort has been made to ensure that good design principles are embedded into the design development of the Scheme. A key change in the recently updated National Planning Policy Framework is the emphasis on good design and the creation of beautiful, high quality places. Chapter 9 sets out that local planning authorities utilise the National Design Guide and the National Model Design Code. Whilst the National Design and Model Design Code are for use by local authorities, similar principles have been adopted for the design of the Scheme as it follows the guidance set out in the Highways England publication "The Road to Good Design". This document contains a series of principles for good road design which are centred on the themes of connecting people, places and processes. The principles from the Road to Good Design are embedded in the Design Manual for Roads and Bridges (DMRB) which is the standard to which the scheme has been designed. Similar themes of the Road to Good Design and the National Design Guide include: • The importance of context, that is ensuring that road design its sensitive to the landscape, heritage and the local community. • The need to achieve an environmentally sustainable design, • Bringing lasting value, Other principles embedded in the Road to Good Design include the need to make roads safe and useful, the need to make roads inclusive and making roads understandable. It's worth nothing that road design has specific demands of technical design and safety that must be met. Since aesthetic considerations must accept these demands, the potential for variation is more challenging, but still possible for many elements such as signs and lighting for example. The Environmental Masterplan **[APP-091]** which forms part of the Environmental Statement illustrates the form and location of design-based features embedded into the Scheme, the development of which has been primarily driven by the process of landscape design using guidance contained in LD 117: Landscape Design (Revision 0). Paragraphs 7.8.6 and 7.8.7 of Chapter 7, Landscape and Visual Impact Effects of the ES **[APP-076]** set out how LD117 has been taken into account in terms of the design of the Scheme. Requirement 12 of the draft DCO **[APP-025**] sets out that the detailed design of the Scheme must accord with the principles set out in the Environmental Masterplan. This requirement therefore ensures that the design outcomes which the Environmental Masterplan delivers are secured in the draft DCO **[APP-025]** and that the embedded design principles are carried through to the detailed design of the Scheme. The Applicant considers this to be a reasonable approach.

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Q1.10.1.3	Applicant	**Additional Question:** **Assessment of good design** What further information will be provided to enable the ExA to assess the Proposed Development against policy requirements in Chapter 12 of the NPPF for high quality, beautiful and sustainable places, in the NPS NN paragraph 4.29 to produce sustainable infrastructure sensitive to place, efficient in the use of natural resources and energy used in their construction, matched by an appearance that demonstrates good aesthetics as far as possible, and in the NPS NN paragraph 4.34 to demonstrate good design in terms of siting and design measures relative to existing landscape and historical character and function, landscape permeability, landform and vegetation.
		Answer: The Applicant proposes to submit further information in relation to design to assist the ExA in advising the SoS on matters relating to visual appearance and good design, in particular scale, height, massing, alignment, and material which will be submitted into the Examination as soon as possible. .
Q1.10.2	**Design development process**	
Q1.10.2.1	Applicant Local Authorities	**Question:** **Design development process** a) What will be the design development process for the structural elements of the Proposed Development described above? How will biodiversity, cultural heritage noise and landscape mitigation be addressed? b) Which parties will be consulted? c) Would it be reasonable to set out design development process for Examination, and for it to be secured in the dDCO?
		Answer: a) To further assist the ExA in advising the SoS on matters relating to visual appearance and good design, in particular scale, height, massing, alignment, and materials, the Applicant will submit further information relating to

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		design as soon as possible. Environmental mitigation is secured in the Environmental Masterplan **[APP-091]** under Requirement 12 of the dDCO **[APP-025]**. b) Local authorities and statutory consultees, such as the Environment Agency, will be consulted on design matters relevant to their function. For example, the local highway authorities will be consulted in relation to the detailed design of the local roads and the Environment Agency will be consulted in relation to culvert design. c) Requirement 12 of the dDCO **[APP-025]** is considered adequate for ensuring the Detailed Design accords with the Preliminary Design and as such, it is not considered necessary or appropriate to further secure the Detailed Design process within the dDCO.
Q1.10.2.2	Applicant Local Authorities	**Question:** **Design Review** a) Has the Proposed Development been for independent design review? Do you intend to take it for independent design review? Provide details. (NPS NN, Paragraph 4.33, footnote 63) b) LAs to comment.
		Answer: The Applicant has not sought an independent design review of the Scheme and does not currently intend to seek an independent design review. However, it should be noted that the Applicant has undertaken a comprehensive design development process, taking into account the principles set out in the Design Manual for Roads and Bridges and notably the Highways England publication "Road to Good Design". This has also included feedback from consultation that the Applicant has carried out which has responded on points of design, for example the lowering of Black Cat Junction to reduce visual impact. Furthermore, good design principles have been embedded into the design development of the Scheme which has been designed according to the principles set out in Highways England's publication "The Road to Good Design". This document contains a series of principles for good road design which are centred on the themes of connecting people, places and processes. This states that good road design: • Makes roads safe and useful. • Is inclusive.

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		• Makes roads understandable. • Fits in context. • Is restrained. • Is environmentally sustainable. • Is thorough. • Is innovative. • Is collaborative. • Is long-lasting. Highways England has sought to embed these principles in the requirements and advice contained in the Design Manual for Roads and Bridges to ensure all schemes benefit from a design led approach. Chapter 2, The Scheme of the Environmental Statement **[APP-071]** sets out how the ten principles within The Road to Good Design have informed the design-development of the Scheme. In addition, paragraph 2.5.119 sets out the Landscape design principles that have been embedded into the Scheme to ensure the design is sensitive to the landscape and visual environment. The Applicant is currently preparing a document setting out the approach to the design process, and the design principles that have been utilised in the design of the Scheme, particularly in relation to the structural elements. This document will be submitted at a future deadline.
Q1.11	**Highways – network and structures**	
Q1.11.1	**Transport Modelling**	
Q1.11.1.1	Applicant Local Highway Authorities	**Question:** Various LA Adequacy of Consultation Responses and associated RRs refer to the input to date of LHAs in the modelling undertaken by the Applicant. a) How have existing LHA traffic and transport models informed the modelling undertaken by the Applicant?

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		b) How have LHAs been involved in the checking of modelling undertaken by the Applicant? c) Do LHAs agree with the methodology adopted by the Applicant in demonstrating the effects of the Proposed Development, particularly on the local highway network? If not, why not?
		Answer: a) During the development of the base year of the A428 Strategic Traffic Model developed for PCF Stage 3, traffic signal timings were obtained from the Cambridge Sub-Regional Model (CSRM) and Bedford Transport Model where the corresponding signal nodes were available. These were considered the best sources of data if South Eastern Regional Traffic Model (SERTM) did not include the required details. In addition, Public Service Vehicles (PSV), i.e., buses and coaches, in or between Bedford, Huntingdon, St Neots and Cambridge have been extracted from the CSRM and Bedford Transport Model and coded as fixed flows in the A428 model. The local junction models using VISSIM, ARCADY and PICADY software were undertaken by AECOM independently on behalf of the Applicant. However, all the models and the data used for developing the models have been shared with the LHAs in order to provide a full opportunity for review. b) There have been a number of meetings and presentations held with LHA representatives including both officers and elected members to discuss a wide range of traffic modelling matters. This included the development of the base year model, traffic forecasts and development of the local operational models as detailed below. A significant quantity of data and traffic models have been passed across to the LA's during this period. Agreement was reached with Bedford Borough Council (BBC) and Central Bedford Council (CBC) on the required data/models for review. Cambridgeshire County Council (CCC) have requested and been supplied with the following: 7 Feb 2020 – Base year strategic traffic models. 7 Feb 2020 – Future year strategic traffic models. 7 Feb 2020 – Traffic zone system in GIS format. 3 March 2020 – Uncertainty Log. 3 March 2020 – Traffic Data Collection Report (TDCR). 3 March 2020 – Draft Local Model Validation Report (LMVR). 7 July 2020 – Draft Traffic Forecast Report (TFR) provided to CCC/BBC/CBC (for comment).

<table>
<tr><th>No.</th><th>Directed to</th><th>Question</th></tr>
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9 July 2020 – Final LMVR provided to CCC/BBC/CBC (for comment) ahead of 21 July 2020 discussion.
23 March 2021– SATURN construction models, x4 Phases.
April 2021 – Construction junction models.
April 2021 – Operational junction models.
April 2021 – Sensitivity Test junction models.
27 May 2021 – Traffic survey data x9 junctions.
9 June 2021 – Traffic survey data @ Buckden & 7 junctions in vicinity of M11 J13.
10 June 2021 – Construction layouts for Vissim models.
21 June 2021 – webTRIS traffic count data x16 locations.
21 June 2021 – Construction model 12 hour traffic flows x4 Phases.
In addition, the following have been supplied to BBC:
4 May 2021 – Black Cat Vissim models.
In addition, the following have been supplied to CBC:
1 July 2021 – Construction traffic flow changes.
7 July 2021 – Operational traffic flow changes.
The table below lists meetings and workshops on the Stage 3 modelling held with LHAs during 2020 and 2021. These meeting topics including strategic modelling, local modelling and impacts arising from construction. The primary purpose of these meetings was to provide an opportunity for any questions or comments LHAs may have.
<table>
<tr><th>Date</th><th>Key topics discussed</th><th>Authority</th></tr>
<tr><td>05/03/2020</td><td>Local Authorities Traffic Meeting (with BBC, CCC and CBC). The project team presented information on the Stage 3 Model, including the model network and area of detailed modelling. The traffic</td><td>CCC, BBC and CBC</td></tr>
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	forecasting process was explained and presented to the local authorities as well as the Model Cordon Data.	
19/05/2020	Traffic and Transport Meeting: LMVR and Modelling. In a Local Model Validation Report (LMVR) and modelling workshop with the local authorities the project team ran through an overview of the Stage 3 Model, including an overview of the base year model calibration and validation performance.	CCC, BBC and CBC
23/06/2020	Traffic and Transport meeting with BBC– LMVR and Modelling Workshop during which the project team ran through an overview of the Stage 3 Model including an overview of the base year model calibration and validation performance.	BBC
21/07/2020	Traffic Forecasting Meeting held with BBC, CCC, and CBC to present the methodology adopted for the traffic forecasting and the results of the future forecasts to the local authorities.	CCC, BBC and CBC
27/07/2020	Meeting with BBC, CCC, and CBC in which the results of the Sensitivity Test were presented using the updated Uncertainty Log to demonstrate that the current forecasts continue to provide a robust basis for the Scheme assessment.	BBC
28/07/2020	A meeting was held with CBC to present a summary of the assessment of the wider traffic impacts and junction capacity modelling to be contained in the Transport Assessment (TA).	CBC
27/08/2020	Transport Assessment meeting to present a summary of the traffic impact and junction capacity modelling to be contained in the Transport Assessment (TA).	CCC
02/09/2020	Local Model Validation Report - Base Year Review Meeting	CCC

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29/01/2021	Meeting with BBC, CCC, and CBC to discuss impacts arising from construction and proposed traffic management measures. This included an outline of the construction management plan, local modelling (including details of junction assessments) and strategic modelling.	CCC, BBC and CBC
05/02/2021	In this meeting with BBC, CCC, and CBC, the results of the sensitivity tests for the update of the Uncertainty Log were presented to the local authorities. This is reported in application document **[TR010044/APP/7.9]** - Sensitivity Test Utilising 2020 Uncertainty Log Data.	CCC, BBC and CBC
22/03/2021	Members Meeting. Consider some of the predicted traffic impacts and report on the junction capacity modelling undertaken (Environmental Team also presented).	CCC
24/03/2021	Members Meeting. Consider some of the predicted traffic impacts and report on the junction capacity modelling undertaken (Environmental Team also presented).	HDC and SCDS
06/05/2021	Initial Local Technical Review Group meeting.	CCC
13/05/2021	Local Technical Review Group meeting - Highways England responses to Statutory Consultation.	CCC
20/05/2021	Local Technical Review Group meeting - Issues on Strategic Models.	CCC
10/06/2021	Local Technical Review Group meeting - Development of Local Models.	CCC
21/06/2021	Members Meeting. Construction Impacts on Traffic.	CCC

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01/07/2021	Joint meeting with BBC and CBC about construction impacts on traffic.	BBC and CBC
01/07/2021	Initial Local Technical Review Group meeting.	BBC
02/07/2021	Local Technical Review Group meeting - discussion on strategic and local models.	CBC
30/06/2021	Members Meeting. Construction Impacts on Traffic.	HDC and SCDS
11/08/2021	Discuss Statements of Common Ground prior to Deadline 1.	CCC
12/08/2021	Discuss Statements of Common Ground prior to Deadline 1.	BBC
12/08/2021	Discuss Statements of Common Ground prior to Deadline 1.	CBC

Through the combination of a significant number of data and models being provided and the meetings/workshops and including the funding made available by the Applicant for Local Authority resources to carry out model reviews, the Applicant considers that every effort has been made to facilitate the active engagement of the LHA's in the modelling process.

c) As can be seen from a) and b) above the LHAs have been fully engaged in the preparation of the traffic models. The Applicant has also sought to engage with the LHAs to provide clarification on queries raised by the LHAs throughout this process. The Applicant has provided a detailed response to all the queries raised in the issues log provided by CCC. In addition, all queries from CBC have been responded to through the issue of technical details and model outputs. In response to more recent requests for further clarification, the Applicant has prepared Technical Note 73 dealing with Junction Modelling. This has been submitted at Deadline 1 **[TR010044/EXAM/9.10]**. The Applicant is not aware of any outstanding requests for information from the LHAs but will continue to engage with the LHAs to resolve, as far as possible, any outstanding concerns of the LHAs in relation to traffic modelling.

Attachments for the response:

No.	Directed to	Question
		<table><tr><th>Name</th><th>Link</th><th>Description</th></tr><tr><td>TN73_BC_to_CG_Local Junctions Modelling Approach_Shortened (Provided to CCC)</td><td>https://a428blackcat.sharepoint.com/:w:/s/DCOExaminationQuestionsTool/EXC1ALc1xytHsdVNgXmUor4BQbwkVQjecARzny5ls5urlQ?e=0Yft0n</td><td>Justification for the Approach taken in undertaking Local Junctions Modelling and Assessment</td></tr></table>
Q1.11.1.2	Local Highway Authorities Applicant	**Question:** **Methodology, inputs and outputs** Paragraph 5.203 of the NPS NN explains that the Applicant should have regard to policies set out in local plans and 5.204 states that the Applicant should consult relevant LHAs and LPAs, as appropriate on the assessment of transport impacts. S16 The Traffic Management Act 2004, places a Network Management Duty (NMD) on local traffic authorities, or a strategic highways company (the network management authority), so far as is reasonably practicable, to ensure the expeditious movement of traffic on the authority's road network and facilitating the expeditious movement of traffic on road networks for which another authority is the traffic authority. a) Do LHAs have any concerns with the data used to underpin the modelling undertaken? If so, please explain your reasoning. b) If further transport modelling is considered necessary, please explain why and where this is needed? c) Do LHAs consider the Proposed Development accords with requirements of the NMD in all regards? Explain with reasons. d) Applicant to comment.
		Answer: The Case for the Scheme **[APP-240]**, Appendix A, (pages A75-A76) provide details regarding how the Applicant has shown compliance with the requirements of the National Policy Statement for National Networks (NPS NN) paragraphs 5.203 and 5.204. Over a significant period of time prior to submission of the application, the Applicant undertook substantial consultation and engagement with relevant LHAs on the assessment of traffic impacts for both the strategic and local

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		network. This included sharing of background data, models and results from the assessment. Numerous meetings were held with the LHAs and technical notes subsequently provided to address concerns raised by LHAs as detailed in the response to Question 1.11.1.1. All relevant LPAs were also consulted on current and future development proposals to inform development of the uncertainty log for the study area. In total, 25 LPAs were consulted, and each provided a response to inform the uncertainty log. This included the identification of development sites that were allocated in Local Plans and those which had obtained planning consent. These were verified in consultation with Local Planning Authority officers and are therefore included in the traffic forecasts for the Scheme through the mechanism of the Uncertainty Log. A specific example is the development at Cambourne West, where the Local Plan allocated 1,200 dwellings but the planning consent included 2,350 dwellings at the time the Uncertainty Log was finalised. This example is detailed at paras 2.3.8 – 2.3.10 of the Transport Assessment **[APP-241]**. An extensive set of local junction models have been developed both along the Scheme alignment and on the wider highway network junctions considered to be impacted by the Scheme. The findings from the junction models along the scheme alignment and its immediate vicinity have been reported in the Transport Assessment **[APP-241** to **APP-242]**. In response to concerns raised by the LHAs a Transport Assessment Annex **[APP-243]** was also prepared for the Scheme, and reports findings of the local models for the wider road network junctions. In preparing the traffic assessments for the Scheme, the Applicant has also had regard to policies set out in local plans in accordance with paragraph 5.203 of the NPS NN. The assessments took account of specific Plan-led development, and the models were adjusted where necessary to reflect the planning status of the sites concerned, such as those at Wintringham Park and Cambourne West as explained above. At Cambourne West, the mitigation scheme committed as part of the planning consent was included in the future year base model of the A428 Cambourne junction. Para 3.6.7 of the Transport Assessment Annex **[APP-243]** refers. Engagement has continued with LHAs since submission of the application, and further clarification has been provided to address any outstanding LHA concerns where possible. The Scheme will produce significant benefits by reducing congestion and journey times along the A428 between Caxton Gibbet and the A1 at Black Cat Junction, as well as providing significant traffic relief to other local routes as a result of traffic transferring to the Scheme. Highways England has therefore complied with its duties under section 16 of the Traffic Management Act 2004, to ensure the expeditious movement of traffic on the strategic network and facilitate this on the LHA's networks. The Applicant will comment on the responses provided by the LHAs to parts a), b), and c) of this question as appropriate in due course. However, the Applicant is not aware of any outstanding requests for information from the

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		LHAs, considers that the data used to underpin the modelling is robust and believes that any further requests for modelling would not be proportionate or reasonable.
Q1.11.1.3	Campaign to Protect Rural England	**Question:** **Comments on transport modelling** RR-023, on behalf of CPRE, refers to the modelling undertaken by the Applicant as not being adequate, explain why this considered to be the case.
		Answer: No response required from Applicant.
Q1.11.1.4	Cambridgeshire County Council	**Question:** **Cambridgeshire traffic impacts** RR-013, received from CCC, makes specific to reference to further information being needed to understand the impacts of the scheme on the local road network in St Neots, at Girton Interchange, Coton and 'others'. Please provide more detail to explain what additional information is required, where and why.
		Answer: This question is meant for CCC and they need to provide the details of the information that have been sought through RR13. No action from AECOM/HE at this moment.
Q1.11.1.5	Applicant	**Question:** **COVID-19** The Strategy for Dealing with the Uncertain Outcomes Arising from COVID-19 document **[APP-257, paragraph 1.3.8]**, explains that in order to consider the potential impacts of COVID-19, sensitivity testing is intended to occur following acceptance of the DCO application. a) When will the Applicant provide this information to the ExA and other interested parties to consider? b) What are the implications of the likely outcomes of the sensitivity testing to the conclusions drawn in the

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		ES?
		Answer: a) The forecasts and economic appraisal for the Scheme were completed prior to the release of revised economic growth projections in July 2020. As noted in section 1.3 of [APP-257] (The Strategy for Dealing with the Uncertain Outcomes Arising from COVID-19), a sensitivity test is required to assess the impact of the latest projections of economic growth in terms of how this would affect the economic benefits of the Scheme. The purpose of this test is to incorporate the updated values relating to: • The long term projections of employment and economic growth issued by the Office for Budget Responsibility (OBR) in March 2020. • The further projections issued in July 2020 as part of the Fiscal Sustainability Report (FSR) of the medium-term impact of COVID-19 on the economy to 2025. This sensitivity test has been completed and is reported in Technical Note 63 (Economic Sensitivity Test **(TR010044/EXAM/9.7)**) which has been submitted at Deadline 1. b) The sensitivity test was carried out following the update of the Transport Analysis Guidance (TAG) Data Book in July 2020 in response to revised projections of economic growth. It should therefore be noted at the outset, that the sensitivity test was intended to assess the impact of the revised forecasts of economic growth on the scheme benefits. The change in forecast flows is negligible for the reasons set out below. The results of the sensitivity test are reported in detail in Technical Note 63 (Economic Sensitivity Test **(TR010044/EXAM/9.7)**). The sensitivity test involved re-running the demand and assignment models that provided forecast data that were used to produce an updated economic assessment. The updated economic parameters were input to the Variable Demand Model (VDM) which is used to estimate the effect of changes in transport infrastructure and travel cost upon patterns of demand. The VDMis described in section 5.4 of Appendix C to the Combined Modelling and Appraisal Report **[APP-253]**. The VDM process therefore takes account of the changes in travel cost as a result of the Scheme.

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The analysis of flow changes resulting from the updated VDM indicated that when compared against the traffic forecasts presented in the Combined Modelling and Appraisal Report **[APP-250]**, the impacts of the sensitivity test parameters on the demand model outcomes and on traffic assignment is very small.

The comparison of the 2040 AM and PM forecast flows with the Scheme, showed very few changes of significance. There are some re-assignment effects along the A14/A1 and M1 corridors amounting to 50 Passenger Car units (PCUs) per hour or less. The majority of flow changes are less than 10 PCUs per hour on roads across the Scheme area and including the Scheme. The change in traffic journey times was also all very minor.

Further details of the flow comparison are provided in section 4 of Technical Note 63 (Economic Sensitivity Test **(TR010044/EXAM/9.7)**).

A comparison of the benefits from the sensitivity test with the original results presented in the Combined Modelling and Appraisal Report **[APP-250]** was carried out. The results are reported in the table below.

This shows that the initial present value of benefits (PVB) reduces by 22% compared to those reported in the DCO submission (Combined Modelling and Appraisal Report, Appendix D: Economic Assessment Report **(TR010044/APP/7.10)**) and wider economic impacts reduce by 17% resulting in a reduction in the adjusted PVB of 19%.

The reduction in economic benefits resulting from the sensitivity test is consistent with the reduced values of time within the July 2020 TAG Data Book. The sensitivity test demonstrates that the adjusted Benefit to Cost Ratio (BCR) would reduce by 0.36 from 1.91 to 1.55. The BCR would remain within the medium VfM category and hence would not affect the Case for the Scheme **[APP-240]**.

Table 12 : Transport related benefits summary (£M)* - May 2019 and July 2020 Sensitivity Test

Benefit Component	May 2019 Data Book	July 2020 Sensitivity Test Data Book	% change
Initial Present Value of Benefits (PVB)	**541**	**420**	**-22%**
Present Value of Costs (PVC)	**463**	**463**	

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Initial Benefit to Cost Ratio (BCR)	**1.17**	**0.91**	
Wider Economic Impacts	259	215	-17%
Journey Time Reliability Benefits	83	83	
Adjusted PVB	**883**	**718**	**-19%**
Adjusted Benefit to Cost Ratio (BCR)	**1.91**	**1.55**	

*2010 prices and values discounted to 2010, rounded to nearest million.

In summary, the main impact of the sensitivity test using the July 2020 Sensitivity Test economic parameters, is to reduce the economic benefits of the Scheme resulting in a reduction of the adjusted BCR from 1.91 to 1.55. However, the Scheme remains within the 'Medium' value for money category, in accordance with para 5.6 of the Department for Transport 'Value for Money Framework', published in July 2017.

The analysis of flow changes has demonstrated there is very little change to traffic volumes on or around the Scheme with limited changes over the wider network. Therefore, the results do not affect the operational impacts and assessment as reported in the Transport Assessment ([APP-241] and [APP242]) and Transport Assessment Annex [APP-243] nor do the results result in any changes to the conclusions drawn in the ES Chapter 16, Summary of Environmental Effects [APP-085].

It is therefore concluded that the results of the sensitivity test using changed economic parameters, consistent with TAG Data Book 1.14, do not affect the traffic forecasts to any significant degree.

As a final point, it should be noted that the sensitivity test was not intended to address the impact of COVID-19 on future traffic growth. It is noted (paragraph 1.3.6 of the Strategy for Dealing with Uncertain Outcomes Arising from COVIC-19 [APP-257]) that the Department for Transport (DfT) provides travel demand forecasts for use in transport modelling through its National Trip End Model (NTEM) data set. These will be updated to align with the latest national population projections and economic growth forecasts and will be informed by the latest DfT research on the impacts of Covid-19 on future travel behaviour. NTEM will provide updated forecasts of future growth based upon the latest evidence, however these are not expected to be issued until early 2022.

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Q1.11.2	**Road layout, junctions and brides**	
Q1.11.2.1	Applicant Local Authorities	**Question:** **Road design and layout** The ExA notes that ES **[APP-072]** provides an overview of alternatives considered and further details about the selection of the preferred option. a) Applicant, provide further information how the proposed highway layouts incorporated feedback from Local Authorities and stakeholders? b) Local Authorities to comment how feedback has shaped the proposals, or not been taken on board.
		Answer: a) **Changes made in responses to non-statutory consultation:** In response to comments received from St Neots Town Council and their request to realign the proposed new dual carriageway to the southeast, the route was moved as far as possible to maximise the field plots between the existing A428. Between bridleway 1/18 and Toseland Road the alignment of the proposed dual carriageway was adjusted to better fit with the existing topography in response to comments received from Yelling and Croxton parish councils and local residents. Moving the alignment of the proposed dual carriageway northwards between bridleway 1/18 and Toseland Road was further justified by comments received from the owners of Croxton Park and North Farm who raised concerns over the proximity of and the impact of the new road on their properties. Through the West Brook Tributary crossing and towards the Eltisley Link, the alignment of the proposed dual carriageway was moved southward in response to comments received regarding an historic landfill site, located to the west of the B1040, as shown Figure 10.1 – Material Assets and Baseline of the Environmental Statement **[APP-142]**, and concerns raised by the owners of Fairview Farm over the proximity of the new road and the impact this would have on their free-range chicken farm. In response to requests made by Roxton Parish Council and the local community to mitigate the visual impact of the Black Cat junction it was decided to lower the alignment of the A1 carriageway into cutting through the junction

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		which reduced the overall height of the three-tier junction above existing ground level which would reduce the overall visual impact of the proposed junction arrangement. **Changes made in response to landowner engagement** In response to comments received from the owner of North East Farm, the alignment of the new dual carriageway was moved southward between the Eltisley Link and the Caxton Gibbet junction to open up the gap between the new and existing roads and help mitigate the direct impacts of the new road on the farm through the provision of additional landscaping. The extent of proposed landscaping was reduced at the following locations in response to concerns raised by landowners: • Pastures Farm, southwest of Caxton Gibbet junction. • Dove Farm, south of The Lane, Wyboston. • Wintringham Farm, south and southwest of Cambridge Road junction. The alignment of the Kelpie Marina access road was influenced by Roxton Garden Centre and the adjacent landowner. Changes including adjusting the alignment of the proposed access road to better fit with the landowner's future use of their remaining landholding and maintain appropriate accesses off the access road into their land. Comments made by the owner of Rectory Farm identified that the original alignment of the proposed route severed the farm and would have resulted in a significant impact on farm operations. This issue was taken into consideration when the alignment of the proposed new dual carriageway was moved south eastwards. Between the B1046 and Cambridge Road, the alignment of the proposed new dual carriageway was moved southwards in response to requests from the owners of Abbotsley Farm and Wintringham Farm to increase the size of the fields located between the existing A428 and the proposed new dual carriageway making the land more viable and economic to farm. **Engagement with Bedford Borough Council** The closures of The Lane, Nagshead Lane, Chawston Lane and School Lane were discussed and agreed at early meetings; this led to the provision of the Roxton Road Link. The alignment and layout of the proposed Roxton Road Link was developed in consultation with, and agreed by, Bedford Borough Council. This included the introduction of the staggered junction arrangement with Chawston Lane which was required on safety grounds, because a

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		straight through crossroad junction arrangement has a much higher risk of accidents through users misreading the road layout and not giving way as required. The highway cross-section width of the diverted Roxton Road was directed by Bedford Borough Council who required that the proposed carriageway width should match that of the existing local road. This requirement was based on a need to maintain a similar local/rural road environment and discourage increased vehicle speeds. Feedback from Bedford Borough Council directly influenced the size of the Roxton Road roundabout. The proposed speed limits along the Roxton Road Link and the diverted Roxton Road were developed and agreed in consultation with Bedford Borough Council. This included extending the existing 40mph speed limit on Roxton Road southwards to the junction with Bedford Road. The proposed introduction of the 40mph speed limit on Bedford Road from south of Park Road up to the Black Cat junction was requested by Bedford Borough Council. In addition, at the request of Bedford Borough Council, kerb islands were provided along Bedford Road to act as a traffic calming and speed reduction measure. Engagement with Bedford Borough Council has led to the adoption of the Kelpie Marina access road and the A1 Service Link to maintain access for the residents along Great North Road and the marina. **Engagement with Central Bedfordshire Council** Feedback from Central Bedfordshire Council directly influenced the cross section and alignment of the Barford Road realignment. **Engagement with Cambridgeshire County Council** The Applicant has engaged with Cambridgeshire County Council and has proposed cross-sections for Cambridge Road junction, Eltisley Link and Caxton Gibbet junction in line with their requirements. The cross-sections of the B1046/Potton Road and Toseland Road are still under discussion. **Engagement with other stakeholders** Technical Working Groups were held approximately once a quarter with parties from Local Highway Authorities and interest groups. This led to engagement with the cycling groups, CamCycle and Cycling Touring Group, where the location of crossing points and the alignment of the shared unsegregated footway/cycleways throughout the Scheme were modified. Engagement with Eltisley Parish Council identified concerns over vehicles continuing to self divert through Eltisley village on completion of the Scheme. A further review of the Eltisley Link southern roundabout identified an amended

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		junction layout could be provided which was received favourably by the parish council. This change is to be further developed and agreed with Cambridgeshire County Council as adopting Highway Authority. b) LA to provide response
Q1.11.2.2	Applicant Local Authorities	**Question:** **Black Cat Junction** a) Further to the USI1 **[EV-001]** and consideration of the Black Cat Junction Design Options document **[APP-247]**, the ExA would request clarification as to how the Applicant determined it to not be feasible to move the junction to the east of that proposed? b) How would the proposed arrangement accommodate access to the intended development near the junction as outlined in the RR received from BBC **[RR-008a]**? c) Do LAs agree that the proposal presented for the Black Cat Junction is the best design and route alignment option overall? (See related questions to *Historic Environment)*
		Answer: a) The Applicant considered locating the junction further to the east, however determined the negative impacts outweighed other impacts associated with the Scheme. These are detailed in Action 4 of the 9.15 Applicant response to actions arising from ISH1. b) The proposed Scheme provides an access off the new Black Cat junction into the land to the south-east of the circulatory which may facilitate the future development aspirations referred to by Bedford Borough Council in their Relevant Response **[RR-008a]**. The Applicant is continuing to engage with Bedford Borough Council on this matter. It is further noted that the proposal to move the proposed Black Cat junction to the east would preclude these development opportunities. c) LA to respond The Applicant notes that the Local Authorities have advised that they support the principle of the Scheme and that no other design or route alignment has been put forward by the LAs at any stage in the consultation process.

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Q1.11.2.3	Applicant	**Question:** **Services slip road** RR-118 from Welcome Break Services states that other design options were put forward for the link road to the services by the company, albeit these proposals have not been provided to the ExA. Why were the proposals discounted?
		Answer: The Applicant has considered the proposals requested by the Interested Party and principally they involved traffic merges directly onto the A1 creating a high risk of conflict between merging traffic and A1 southbound users wishing to exit for Black Cat junction. The proposals did not present a safe alternative to that which is included within the application and would require a Departure from Standards. Any proposals that consider a merge onto the A1 will be within close proximity to the A1 southbound off-slip road to Black Cat junction circulatory. The proposed Scheme will see a considerable number of vehicles using the slip road to head west towards Bedford, Milton Keynes and the M1. At peak times, the available gaps for merging traffic will be sparse and may lead to dangerous manoeuvres. Video footage has shown a number of near misses associated with the existing merge situation from the service area. The proposed Scheme would exacerbate the issue if a merge is provided directly onto the A1 as the A1 ~~will~~ would be a more free-flowing link with more vehicles positioned in the left-hand lane to take the diverge. This is contrary to the existing Black Cat roundabout arrangement where vehicles are in the right-hand lane to head towards Bedford. The A1 Services Link has been provided to allow safe egress from the service area onto the Black Cat junction circulatory for users to continue their journey.
Q1.11.2.4	Applicant	**Question:** **Eltisley Roundabout** RR-033, received from Eltisley Parish Council, suggests the creation of a new roundabout directly linking with the B1040 and thereby preventing vehicles travelling through village. Provide assessment of this proposed alternative.
		Answer: A local junction capacity model has been developed to assess the capacity of the junction between the current A428 and the B1040 (south) and has demonstrated that this junction remains within capacity through to 2040 with the

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		Scheme in place. It is the Applicant's view that this further assessment shows that there will no longer be an incentive for B1040 south-north traffic to travel through the village. The proposed Eltisley Link roundabouts have been designed to provide an offline buildability solution appropriate to the design speeds of the approach roads. The proposed solution reduces health and safety risks and would likely provide better management of traffic during construction compared to the alternative proposed. The relocation of the southern roundabout away from the eastern entrance to the village and at the existing A428/B1040 junction would have the following impacts: • A more elevated link between the roundabouts therefore with greater earthworks and may further result in increased noise and visual impacts. • Road geometries that are below desirable minimums which would have potential safety impacts • The need for a wider structure over the new dual carriageway to accommodate sight stopping lines on the approach to the northern roundabout and therefore inefficient capital and maintenance costs • A requirement to modify existing infrastructure including affected utilities, watercourses and realignment of the approach roads with associated effects on surrounding land. For these reasons, Eltisley Parish Council's alternative is not considered necessary or appropriate. The Applicant has engaged further with Eltisley Parish Council, post submission of the DCO Application, on a different alternative to the proposed southern roundabout of the Eltisley Link – adjusting the location a short distance to the west, with in the current limits of deviation. This proposal was received favourably by the Parish Council and the change will be developed during detailed design and in consultation with Cambridgeshire County Council, as the local highway authority.
Q1.11.2.5	Applicant	**Question:** **Roxton Road Bridge** a) RR-093 received from Roxton Parish Council suggests the creation of a roundabout instead of T-junction at the bridge and the C44 road. Provide assessment of this proposed alternative. b) Various RRs, including RR-108 from the British Horse Society and RR-008a from BBC, also suggest amendments to the link to allow better access for horse-riders. Please respond to these suggestions.

No.	Directed to	Question
		Answer: a) The assessment of the proposed priority junction confirms that it will operate will within capacity, as stated in paragraph 7.9.1 Minor Scheme Junction Assessments of the Combined Modelling and Appraisal Report Appendix C **[APP-253]**. An assessment of the accident history at the existing Roxton Road/Bedford Road junction has not identified a fundamental safety issue. The proposed alternative of a roundabout would increase the footprint of the junction in comparison to the priority junction (T-junction) and would require additional land acquisition which would result in associated and unnecessary increased vegetation removal and impacts on biodiversity. Furthermore, the siting of the roundabout would need to be closer to the A421/new dual carriageway to avoid acquisition on the Roxton Garden Centre and surrounding land. This would shorten the Roxton Road over the new dual carriageway and impact on the vertical alignment, resulting in a roundabout which needs to be elevated. This would again unnecessarily increase the extent of earthworks and may further result in increased noise and visual impacts. In addition, Bedford Road would require realignment on the approach to this elevated roundabout with further impacts on the Rockham ditch watercourse, the associated culvert and vegetation. The provision of a roundabout would increase the impermeable area and require additional land acquisition for attenuation before discharge into the watercourse. It is for these reasons that there is no justification for the proposal of a roundabout. b) As part of Deadline 1 of the DCO Examination, the Applicant has provided responses to the Relevant Representations. For detailed responses to the points raised by the British Horse Society, please refer to RR-108 and RR-008a of 9.1 Applicant Response to the Relevant Representations. In the delivery of the Scheme, the Applicant has sought to re-provide Public Rights of Way and designated routes that are severed or disrupted as a result of the Scheme. The provision for walkers, cyclist and horse-riders is determined on an identified need basis for which evidence is gathered. Provision is not made by default for specific user groups. The assessment of the existing provision and need is detailed in the Walking, Cycling, Horse-riding Assessment and Review (WCHAR) report undertaken by the Applicant in the Transport Assessment – Part 2 **[APP-242]**. The Applicant has considered relevant national and local policies and strategies, as well as collision history, trip generators and other transport services in the determination of the provision. Any additional provision above that determined from the WCHAR is outside the scope of the Scheme.

No.	Directed to	Question
Q1.11.2.6	Applicant	**Question:** **Business and property accesses** Various RRs refer to a lack of detail regarding proposed accesses to business and properties, including intended dimensions and materials. Will this detail be provided during the Examination period, if not how will these matters be dealt with and secured?
		Answer: Replacement accesses to businesses and properties have been provided to maintain the current access provisions to reduce the impact on the landowner as far as practicably possible. Should re-provision of an access result in a reduction to the value of retained land this will be dealt with by way of compensation. The detailed design will consider each access on a case-by-case basis and the Applicant will consult with the landowners on the final details, for example pavement construction widths, fencing, gate details and security details. Therefore, the Applicant does not intend to provide any further details on the dimensions and materials, other than what has been shown on the Plans.
Q1.11.2.7	Applicant	**Question:** **Loss of rest areas and service station at Black Cat** Various RRs, including from Shell UK LTD **[AS-001]** refer to the proposed loss of service and rest areas as a result of the Proposed Development in the vicinity of the Black Cat junction. a) Where are the nearest alternative facilities (including access for HGVs) located on the strategic road network for those highway users intending to use the Proposed Development? b) Do these sites currently have adequate facilities to replace that which would be lost? If not, how would such facilities be improved and how would this be secured? c) How would highway users be made aware of nearest alternatives?
		Answer: a) Please see the list below for the nearest facilities for the services lost at Black Cat roundabout:

No.	Directed to	Question
		– The nearest service area along the A1 southbound carriageway is the Welcome Break, approximately 1.0km north of Black Cat roundabout for which the proposed A1 Services Link would be provided. This service area accommodates for HGVs. – The nearest service area along the A1 northbound carriageway is the Esso garage, approximately 4.2km, south of Black Cat roundabout and near Sandy. This service area does not accommodate HGVs. The nearest service area that accommodates HGVs along the A1 northbound carriageway is at Applegreen Biggleswade service area, approximately 15.2km, south of Black Cat roundabout near Biggleswade. – The nearest service area along the A421 eastbound and westbound carriageways is the BP garage, approximately 15.3km, west of Black Cat roundabout at the interchange with the A6. This service area is part of a grade separate junction and facilitates both directions of travel. This service area does accommodate HGVs for fuel only, no rest area. – The nearest service area along the A428 is the Shell garage at the proposed Caxton Gibbet grade separated junction. This service area currently does and will accommodates both directions of travel and HGVs for fuel only, no rest area. b) The facilities that are lost from the demolition of the Black Cat junction services are a fuel filling station including refreshments and accommodation. The existing facilities do not include an HGV rest area or an opportunity for HGVs to re-fuel. The sites along the A1 and at Caxton Gibbet junction described above do not have accommodation provision for those lost at Black Cat junction, whereas the facilities at the A6 interchange with the A421 does include accommodation. It is for the private sector to promote and operate service areas that meet the needs of the travelling public and are subject to the provisions of relevant planning legislation and regulation. The Applicant suggests that other private accommodation facilities are sought at the nearby towns of Bedford, St. Neots, Sandy and Cambourne for those that are lost at Black Cat roundabout. Guidance from both DfT and Highways England suggest that service areas should be spaced no more than 45km or a 30-minute drive. The guidance identifies no mandatory requirements for accommodation provision at service areas. The removal of the Black Cat junction service area, does not contravene this guidance with the following distances:

No.	Directed to	Question
		– BP garage at the A421 interchange with the A6 to Shell garage at the Caxton Gibbet junction is approximately 31.2km taking 20 minutes for both the eastbound and westbound direction of travel. – Esso garage to the Brampton Hut services is approximately 22.1km taking 16 minutes for the A1 northbound direction of travel. – Welcome Break to the service area at Sandy Roundabout is approximately 7.6km taking six minutes for the A1 southbound direction of travel. In addition, new lay-by facilities would be provided along the new dual carriageway to enable road users to rest before continuing their journey. The Scheme does not propose improvements to the alternative facilities and therefore these do not need to be secured through the draft DCO. c) Presently, the road users travelling along the existing A1 are not informed (through advanced signage) of service areas along the route and would rely on familiarity of the area, service area advertising signs or maps (including GPS). It is considered that the routes would continue to operate in a comparable manner.
Q1.11.2.8	Applicant	**Question:** **Monitoring of transport and traffic effects** The Applicant intends to adopt a monitor and manage approach, in the operational phase of the Proposed Development, including as referenced in TA Annexe [APP-243]. The outline CTMP **[APP-244]** also explains that traffic would be monitored during construction phases. a) Provide examples of where such an approach has been taken on other NSIPs? b) What led to any subsequent intervention? c) What the intervention(s) was?
		Answer: a) The Highways England: Licence 2015 (Licence), places an obligation on the Licence holder (Highways England) in relation to the strategic road network (SRN) to "operate and manage in the public interest, in respect of both current activities and needs in providing effective stewardship of its long-term operation and integrity". Highways

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		England must, under the Licence, at paragraph 4.2(c) "ensure the improvement, enhancement and long-term development of the network". In complying with 4.2(c), and Part 6 of the Licence, Highways England must: *"Establish and maintain a clear understanding of the pressures upon and impacts of its network at both a national and route level (including in the preparation of route strategies, as required at 5.13 [of the Licence]),and be aware of the actions needed to improve conditions for users, and manage or mitigate existing problems, to inform the future development and improvement of the network and its performance."* To fulfil this commitment Highways England extensively monitors the performance of its network using data collected from daily counters, manual counts and feedback from local authorities and its operational teams. The monitoring data and data from Post Operational Evaluations Data from major schemes is analysed to develop Route Strategies. The outputs of which drive study areas and form a key building block of Highways England's future works programme. b) As noted above, in meeting the conditions of the Licence, Highways England will review and consider pressures on the SRN and determine what interventions are required in order to ensure the efficient running of the network. For example, interventions have been brought forward to address the following types of issues: • combat congestion • improve safety • unlock growth • connect people c) Generally, the interventions implemented under the monitor and manage approach will be determined by the need in that specific case. An intervention could be as minor as amending the lane configuration to redistribute traffic or a much more extensive intervention such as a new junction or additional carriageway. The interventions will be determined by Highways England in fulfilling its obligations under its Licence.
Q1.11.3	**Signage and lighting**	
Q1.11.3.1	Applicant Local Authorities	**Question:** **Gantries and signage**

No.	Directed to	Question
		a) Confirm the likely timescale for submission of detailed signing proposals, including gantries, to the examination. b) If the Applicant is not intending to provide this detail as part of the Examination, how can the ExA be satisfied that specific matters relating to design and visual impact (NPS NN paragraphs 4.28 to 4.35), matters raised in RRs, including **[RR-001]**, relating to signage and highway safety, would be considered? c) Local Authorities to comment.
		Answer: a) The proposals for signage and gantries are not currently available, however will be progressed through the detailed design stage of scheme development, which will be post consent of the Application. The detailed design of signage and gantries will be developed in line with current regulations and standards, which determine the location, size and form of these features. b) The impacts of the proposed road signage and gantries have been assessed as part of the landscape and visual effects assessment which is reported in Chapter 7, Landscape and Visual Effects of the Environmental Statement **[APP-076]**. The Environmental Masterplan **[APP-091]** which forms part of the Environmental Statement illustrates the form and location of design-based features embedded into the Scheme, the development of which has been primarily driven by the design vision and principles set out in Annex L of the First Iteration Environmental Management Plan **[APP-234]**. The Landscape and Visual Impact Assessment (LVIA) set out in Chapter 7, Landscape and Visual Effects of the Environmental Statement **[APP-076]** considers structural elements, including signage and gantries in making judgements and drawing overall conclusions on the likely significant effects of the Scheme of relevant receptors. Four gantries are proposed and these are labelled as "Variable Message Sign" (VMS) on the General Arrangement plans **[APP-011]**. The VMS signs will be supported on gantries that are cantilevered over a portion of the nearside lane. The Applicant has not proposed structures that span over the entirety of the new dual carriageway. With the exception of the VMS proposed to the east of the East Coast Mainline, all VMS are proposed to be located adjacent to existing highway infrastructure and have been sited, as far as practicable, to minimise visual impacts. They are referred to where relevant in the Appendix 7.3: Landscape Baseline and Assessment **[APP-181]** and Appendix 7.4: Visual Baseline and Visual Effects Schedule **[APP-182]**. The Applicant considers that the information available within the Application is sufficient to judge the potential for likely significant impacts to arise as a result of the Scheme design. The Applicant in response to the comments

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		raised by the ExA at the Issue Specific Hearing is considering the extent to which further information on the progress towards detailed design can be provided. c) LA to respond
Q1.11.3.2	Applicant Local Authorities	**Question:** **Lighting arrangements** a) Confirm the likely timescale for submission of lighting proposals to the Examination. b) If the Applicant is not intending to provide this detail to the Examination, how can the ExA be satisfied that the Proposed Development would not have adverse significant effects regarding artificial lighting? c) Local Authorities to comment. (See related questions in *Landscape and Visual Effects)*
		Answer: a) The extents of the proposed road lighting are shown on the General Arrangement Plans **[APP-011]**. The specific proposals for lighting are not currently available, however will be progressed through the detailed design stage of the Scheme development, which will be post consent of the Application. The detailed design of lighting will be developed in line with current standards, which determine the location, size and specification of these features. It should be noted that in accordance with Requirement 17 of the dDCO **[APP-025]** no part of the authorised development may be brought into use until a written scheme of the proposed highway lighting to be provided for that part of the authorised development has been submitted to the Secretary of State for approval, following consultation with the relevant local authorities on matters relating to its functions. Requirement 17 further sets out the various specifications etc. that the lighting scheme must comply with. b) The effects of temporary lighting during construction and the proposed, permanent road lighting have been assessed as part of the Landscape and Visual Impact Assessment (LVIA) assessment. These effects are summarised in Chapter 7, Landscape and Visual Effects of the Environmental Statement (Landscape and Visual Effects) **[APP-076]**. The LVIA acknowledges that a range of adverse significant effects would arise from the Scheme, including the effects of night time lighting. These effects have been considered for all Local Landscape Character Areas (LLCA) and for all residential visual receptors during the construction and operational phases of the Scheme. These effects were assessed against the existing night time baseline, which is not intrinsically dark

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		and includes substantial areas of artificial lighting in the areas where new lighting is proposed within the Scheme. This is evidenced by Figure 7.7 (Night time baseline) of the Environmental Statement **[APP-108]**, which uses England's Light Pollution and Dark Skies Data, provided by CPRE. During construction, temporary lighting would be required to illuminate the works and provide security to site compounds. Mitigation proposed to minimise these effects is set out in the First Iteration Environmental Management Plan **[APP-234]**. As described in paragraph 7.8.17 (f) of Chapter 7, Landscape and Visual Effects of the Environmental Statement Landscape and Visual Effects) **[APP-076]**, this would include "*keeping construction lighting to the minimum luminosity necessary for safe working within construction compounds and working areas and where possible, fitting it with motion sensors to minimise the duration of potential light spill in night time views. Lighting will also be designed, positioned and directed so as not to unnecessarily intrude on adjacent buildings, ecological receptors, structures used by protected species and other land uses to prevent unnecessary disturbance, interference with local residents, railway operations, passing motorists, or the navigation lights for air or water traffic*." This would contribute to significant adverse effects to eight of the 16 LLCAs identified, namely LLCA 02, LLCA 03, LLCA 04, LLCA 05, LLCA 06, LLCA 08, LLCA 11 and LLCA 14, as set out in Appendix 7.3 (Landscape Baseline and Assessment) **[APP-180]**. For visual receptors, temporary lighting during construction would contribute to the significant effects reported in the LVIA of residents living in proximity to the works, as set out in Appendix 7.4 (Visual Baseline and Visual Effects Schedule) **[APP-181].** Permanent artificial lighting is proposed in four locations: around the new Black Cat junction, Cambridge Road junction, Eltisley Link and Caxton Gibbet junction. Street lighting is already present in these locations, although the lighting proposed would generally be more extensive. The headlights of traffic moving along the Scheme would also introduce lighting into darker areas of the landscape. Mitigation proposed to minimise these effects includes tree and shrub planting and earthwork bunds, as shown on the Environmental Masterplan **[APP-091]**. This additional lighting would not give rise to additional likely significant effects. Adverse significant residual landscape effects (year 15 of operation) are reported for LLCA 02, LLCA 06, LLCA 08 and LLCA 11, as set out in Appendix 7.3 (Landscape Baseline and Assessment) **[APP-180]**. The impacts of night time lighting on residential visual receptors would be limited, in the context of existing lighting as described above and would not give rise to additional likely significant effects. Adverse significant residual effects , which would be limited to a small number of residential receptors with more open views at Roxton, Chawston, Wyboston, Little Barford, Abbotsley, St. Neots and Wintringham, are set out in Appendix 7.4 (Visual Baseline and Visual Effects Schedule) **[APP-181].** c) LA to respond
Q1.11.4	**Operational effects beyond the extent of the proposed scheme**	

No.	Directed to	Question
Q1.11.4.1	Applicant Local Highway Authorities	**Question:** **M11 Junction 13** The TA Annex **[APP-243, Section 3.9]** provide analysis of the above Junction and associated roads, explaining that the location is known to suffer severe congestion and would experience additional congestion as a result of the Proposed Development. a) Have any proposals for improvements at this junction been progressed since the time of the consultation and application for the Proposed Development? b) What are the indicative timescales for improvements at the location? c) How confident can the ExA be, with reference to what is secured in the dDCO, that improvement works will be undertaken at this location in future?
		Answer: a) M11 J13 is part of the Road Investment Strategy 3 (RIS 3) pipeline development. It is currently at the first stage of project development, options development stage. During this process it will be determined whether the proposed development will become a committed scheme. At that point a timeframe will be set for delivery, although we note that generally RIS 3 schemes are expected to be delivered during the Road Investment Period 3 (2025-2030). b) If the M11 J13 interventions become a committed scheme, it would be delivered or commenced within the RIS 3 period, i.e. 2025 onwards. c) As noted in response to Question 1.11.2.8, Highways England have an obligation to ensure the efficient management of the strategic road network and where there is an issue Highways England will investigate whether an intervention is necessary to solve this. Any intervention determined necessary by Highways England may be brought forward through a committed RIS scheme or the smaller works programme. The extent and timing of any intervention will be determined as a result of the monitoring undertaken by Highways England.
Q1.11.4.2	The Applicant	**Question:** **Girton Interchange** TA Annex **[APP-243, Section 3.10]** provide analysis of the Girton Interchange and explains that although observed to

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		have been recently upgraded in May 2020, congestion is anticipated at the eastbound merge with the A428 in the 2025 DS AM peak and in the 2040 AM Peak for both DM and DS scenarios. Given the DS scenario is stated to be a 19% increase compared to the DM scenario why does the Applicant not consider amendments should be made to the merge as part of, or at the same time, as the Proposed Development rather than adopt a 'monitor and manage' approach?
		Answer: Monitor and managing will identify future schemes that should be added to the Road Investment Strategy (RIS) programme. Undertaking works at the Girton Interchange is beyond the scope of the Scheme. However, in accordance with Highways England Licence, and as set out in response to Question 1.11.2.8, Highways England's obligation to 'monitor and manage' the strategic road network will ensure that any future interventions necessary will be considered as part of a future RIS or a smaller works programme.
Q1.11.5	**De-trunking proposals and new local highway infrastructure**	
Q1.11.5.1	The Applicant Local Highway Authorities	**Question:** **De-trunking proposals** The Case for the Scheme document **[APP-240, paragraph 1.1.3 g]**, refers to existing safety and maintenance issues along the existing A428. The ExA have visited the route intended to be de-trunked and would request further information as detailed below: a) Please explain what these maintenance issues are. Has the detail of current and proposed asset condition been shared with LHAs? If not, explain with reasons. b) What certainty do LHAs currently have with regard the intended condition of those highway assets that will be their responsibility in future, particularly at the point of handover? c) Will the identified 'maintenance issues' be resolved prior to handover to LHAs and how will this be secured? d) At the point of LHA adoption, how will any outstanding required maintenance be funded and secured?
		Answer: a) There are no known specific unusual maintenance issues with the existing A428 but rather the "existing corridor" with concerns regarding the existing accesses between side roads and the A1 north of Black Cat Junction which

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		do not meet standards. Highways England carry out condition surveys annually to ascertain pavement conditions and the structures are inspected bi-yearly. Pavement renewals between St Neots and Caxton Gibbet were carried out prior to the start of the A14 Huntingdon to Cambridge Scheme as it was used as a diversion route during that scheme. There are no further maintenance schemes planned for the route in the remainder of Road Investment Strategy Period 2. Condition data is being shared with Bedford Borough and Cambridgeshire County Council and will continue to be shared up to the point of handover. The Scheme has also agreed that Cambridgeshire County Council, on request, can undertake their own pavement condition surveys of the de-trunked route. b) A draft side agreement has been circulated to each of the relevant local authorities. It is anticipated that the side agreement will, when agreed, set out a handover plan covering the condition of the existing A428 to be de-trunked. c) There are no specific maintenance issues with the existing A428 but rather the "existing corridor" with concerns regarding the existing accesses between side roads and the A1 north of Black Cat Junction which do not meet standards. The Applicant and the relevant local authorities are currently negotiating the terms of a draft side agreement. It is anticipated that the draft side agreement will, when agreed, contain a process by which the de-trunked aspects of the existing A428 will be handed over to the relevant local highway authorities. d) Should it be agreed between the parties that further maintenance must be carried out or funded by the Applicant, this agreement will be secured in the draft side agreement currently being negotiated between the Applicant and the relevant local authorities.
Q1.11.5.2	Local Highway Authorities Applicant	**Question:** **Speed limits** It was apparent at the time of USI1 **[EV-001]** that both the existing local and strategic highway network in the area has differing speed limits. ES **[APP-071, paragraphs 2.5.101 and 2.5.102]** refer to proposed speed limits of the Proposed Development. a) If applicable, do the existing and proposed speed limits of those sections of highway intended to be de-trunked and other sections to be made the responsibility of LHAs meet locally adopted speed limit policies? Explain with reasons. b) How would any necessary amendments be secured?

No.	Directed to	Question
		Answer:
Q1.11.6	**Non-motorised users**	
Q1.11.6.1	Applicant Local Highway Authorities Interested Parties	**Question:** **Providing opportunities for NMUs** a) To what extent does the Proposed Development comply with the NPS NN paragraphs 3.3, 3.17, 5.205 and 5.216, and any other relevant policies, which relate to providing opportunities for walking and mitigating impacts for non-motorised users? b) To what extent have pre-existing severance issues, within the extent of the proposed scheme, been addressed as part of the Proposed Development?
		Answer: a) The Case for the Scheme **[APP-240], Appendix A,** sets out an assessment of the Scheme against the NPSNN, including against the paragraph 3.3, 3.17, 5.206 and 5.216. The Applicant considers that the Scheme complies with these policies. Although the severance of some existing public rights of way was unavoidable because of the Scheme alignment, routes (where they are not affected by other developments such as at Wintringham) are reconnected via bridges or underpasses. The Scheme also provides opportunities to access wider networks, for example, the right of way that will be created along the east side of the new dual carriageway near Wintringham, allowing walkers to connect with footpaths 1/9, 1/20, 1/19, 1/17 and 1/16. At the junctions (as described below) the provision made is greater than the existing provision, which is either non-existent, of poor quality or sub-standard. Furthermore, due to expected significant reduction in volume of traffic along the existing A428 between the Cambridge Road and Caxton Gibbet junctions; the existing A428 will be easier to cross or walk or cycle alongside.

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		b) The Applicant has sought to address pre-existing severance issues relating to walkers, cyclists and horse riders where it has been possible to do so. This includes provision for the following: • The existing footpaths to the west of Black Cat junction (footpaths 10 and 7) stop at the highway boundary of the existing A421 dual carriageway. No provision is provided to link these routes onto facilities adjacent to the carriageways. As part of the Scheme, these routes have been reconnected to the Roxton Road and the Roxton Road Link respectively for access to the wider network. • There is a shared footway/cycleway at the side of the A1 northbound carriageway. This passes through the existing Black Cat roundabout and is generally narrower than the minimum width required by DMRB standard. The Scheme includes provision of a new route, starting at School Lane, south of Black Cat junction, that runs via a new 4m footway/cycleway alongside the Kelpie Marina access road, Bedford Road, Roxton Road and the Roxton Road Link to Wyboston. This also links in with Sustrans National Cycle Network Route 12. • At Cambridge Road junction, where there is an existing footway, a new 3m wide footway/cycleway with crossing points is provided from the existing Cambridge Road roundabout, through the junction, to the tie-in with the existing A428 east of the new junction. To the east of Cambridge Road junction, a bridleway crossing of the existing A428 is to be enhanced by clearance of the verge on one side of the road, this will allow the crossing points to be perpendicular to one another, minimising the length of the crossing. • At Eltisley a new 3m wide footway/cycleway is being provided through the roundabouts and link over the new dual carriageway, where no facilities currently exist. • At Caxton Gibbet a new 3m wide footway/cycleway with crossing points is being provided, from the northern roundabout to a point south of the southern roundabout, to replace and extend an existing footway/cycleway at the existing roundabout.
Q1.11.6.2	Local Highway Authorities Interested Parties	**Question:** **WCHAR Survey data** The TA [APP-242, Section 2.21] explains that no new pedestrian, cyclist or equestrian usage data has been collected since July and August, 2016. Do LHAs and IPs consider that the information provided gives an acceptable and up to date picture of current usage by walkers, cyclists and horse-riders of the local road and PRoW network?
		Answer:

No.	Directed to	Question
		The WCHAR in the TA **[APP-242, Section 2.21]** was finalised in February 2020 and is an assessment of the Scheme at that time. The Applicant has undertaken a Public Rights of Way/NMU survey in late August/early September 2020 and is presented in the Environment Statement Appendix 12.1 - Public Rights of Way Survey **[APP-216]**. The survey undertaken does not impact the outcomes of the WCHAR in the TA, as the numbers of users recorded during the updated survey was similar to those recorded during the 2016 surveys. The only exception to this was the use of Footpaths 194/53 (1/20), 194/54 (1/19), 194/52 (1/17) and 194/51 (1/16) where no users were recorded. This is due to the construction works associated with the Wintringham development.
Q1.11.6.3	Applicant	**Question:** **Provision for horse-riders** a) Various RRs make refence to a perceived lack of facilities for horse-riders being provided as part of the Proposed Development. Explain why the proposed facilities for walking and cycling do not accommodate equestrians by default. b) In advance of responding to RRs the Applicant is requested to specifically address the points raised by the British Horse Society in **RR-108**.
		Answer: a) In the delivery of the Scheme, the Applicant is required to re-provide NMU routes that are severed or disrupted as a result of the Scheme. Where appropriate the Applicant seeks to deal with existing severance issues. Whilst wider interventions may sometimes be appropriate to address community severance resulting from the existing strategic road network, it is beyond the proper scope of the Scheme to address all existing issues faced by existing users of the wider highway network. The provision for walkers, cyclist and horse-riders is determined on an identified need basis for which evidence is gathered. Provision is not made by default for specific user groups. The assessment of the existing provision and need is detailed in the Walking, Cycling, Horse-riding Assessment and Review (WCHAR) report undertaken by the Applicant in the Transport Assessment – Part 2 **[APP-242]**. The Applicant has considered relevant national and local policies and strategies, as well as collision history, trip generators and other transport services in the determination of the provision. Any additional provision above that determined from the WCHAR is outside the scope of the Scheme. The Applicant does not preclude the local authorities from implementing enhanced measures or contributing to the

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		additional costs associated with these upgrades. It would be for the local authority to evidence the need for the upgrades and secure any additional land to deliver these facilities. The carriageway of the proposed local roads can be legally used by horses and carriages; the Applicant has not provided se`parate provision where usage does not exist. Should the local authorities wish to extend the bridleway network within the area, including off-carriageway routes, the Proposed Development does not preclude any such extensions or alterations in the future. b) As part of Deadline 1 of the DCO Examination, the Applicant has provided responses to the Relevant Representations. For detailed responses to the points raised by the British Horse Society, please refer to RR-108 of 9.1 Applicant Response to the Relevant Representations.
Q1.11.6.4	Applicant	**Question:** **Clarification of PRoW crossing points** a) For clarity, does of the ES **[APP-071, paragraph 2.5.96]** include all PRoW severed by the Proposed Development? If not, please list all other at grade PRoW crossing points of the Proposed Development. b) Also, in tabular form, for each intended PRoW diversion please confirm the net increase or decrease in length of the PRoW as a result of the associated diversion in kilometres.
		Answer: a) The list in paragraph 2.5.96 of Chapter 2, The Scheme of the Environmental Statement **[APP-071]** addresses the severed PRoW for which a diversion is provided. It does not address the routes that are stopped up and for which no diversion is provided. The only PRoW severed in its entirety for which no diversion is provided is Footpath 36.The footpath is a short route of approximately 130m that spurs off footpath 8 and passes behind the Black Cat roundabout service area to join the shared footway/cycleway along the A1. The shared footway/cycleway along the A1 is being re-provided by the shared provision along the Roxton Road link for which Footpath 8 connects. b) Please see Appendix to Q1.11.6.4 which outlines the Public Rights of Way (PRoW) proposals including the removed and added lengths with, where possible, reference to the Streets Rights of Way and Access Plans (SROWA Plans) **[APP-013]**. The diverted public rights of way in the table below are typically those that have both a length of PRoW removed and added. The overall net gain in PRoW length is 4.13km.
Q1.11.6.5		**Question:**

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	Applicant Interested Parties	**Clarification of other known NMU routes** a) The ES **[APP-071, paragraph 2.5.97]** refers to other existing routes requiring modification to maintain connectivity. Confirm the net increase or decrease in length of each route as a result of the proposed modification in kilometres. b) Do IPs consider any other existing routes should be considered for modification? If so, why?
		Answer: a) Please see Appendix to Q1.11.6.5 which outlines all the Non-Motorised Users (NMU) proposals including the removed and added lengths with, where possible, reference to the Streets Rights of Way and Access Plans [APP-013]. Paragraph 2.5.97 of Chapter 2, The Scheme of the Environmental Statement [APP-071] refers to the known NMU routes as part of the existing highway that will become a dedicated PRoW. The table in Appendix to Q1.11.6.5 covers all NMU provision in the existing highway affected and re-provide by the Proposed Development. The overall net gain in NMU length is 2.334km. NMU routes are typically a shared footway/cycleway adjacent to the carriageway. b) This part of the question is not for the Applicant to respond to. The Applicant will provide any response to the points raised at Deadline 3.
Q1.11.6.6	Bedford Borough Council Applicant	Question: Sustainable development a) Provide further detail and plans to support the comments in your RR regarding access to EWR stations and, space to accommodate other modes of travel on Barford Road overbridge, adjacent to the ECML and under the new road [RR-008a]. b) Applicant to comment.
		Answer: a) This part of the question is not for the Applicant to respond to. The Applicant will provide any response to the points raised at Deadline 3.

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		b) East West Rail has now completed their non statutory route options consultation. Given East West Rail has not yet determined the route and locations of the proposed stations, it is not possible for the Applicant to make or coordinate any specific provision for any new infrastructure which may be required as part of the East West Rail scheme. The design of Barford Road is a replacement of the existing infrastructure. As the existing infrastructure does not include provision for walkers, cyclists and/or horse-riders this is not proposed in the design of the Barford Road side road diversion or overbridge. The preliminary design for Barford Road including the bridge crossing has been developed and agreed in consultation with Central Bedfordshire Council as the maintaining highway authority. The proposed structure over the East Coast Main Line includes vehicular access through the side spans for landowners. However, no provision has been made for pedestrians and cyclists alongside the East Coast Main Line as there are no existing rights of way within the area.
Q1.11.7	**Non-motorised users**	
Q1.11.7.1	Applicant	**Question:** **Outline CTMP Clarification – Travel Plan** TAR **[APP-241, paragraph 9.3.10]** explains how the term construction traffic is defined. For clarity, does this term include workers commuting to and from the Proposed Development's construction site(s)? Does the Applicant intend to produce a Travel Plan for employees and contractors involved in the construction of the Proposed Development and if so, how would this be secured?
		Answer: Construction traffic is defined as all operational vehicles used by staff, who are travelling between parts of the site, together with all deliveries of plant and materials required for the works. It does not include commuting employees. The Applicant is not proposing to produce a separate Travel Plan for employees and contractors however details of the routes to be used by all construction traffic are included in the Outline Construction Traffic Management Plan (OCTMP) **[APP-244]**. The OCTMP also includes details under paragraph 3.3.3 of how the permitted routes and restricted routes will be communicated to staff, workforce, visitors and delivery drivers and the signs that will be erected on the restricted routes. This will be reviewed ahead of construction start to identify opportunities for

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		sustainable travel, and how this can be supported and to ensure sufficient parking is available within the compound to prevent disruption to the local network. Each individual working on the construction of the Scheme will undertake a site specific induction prior to commencing any works. As part of the induction process, information will be provided on compound locations and working areas throughout the Scheme. It would also include local travel amenities including road, rail and alternative public transport options.
Q1.11.7.2	Local Highway Authorities	**Question:** **Outline CTMP Consultation** Are LHAs content with the scope and content of the outline CTMP **[APP-244]**? Please provide reasons for any concerns with any aspect of it.
		Answer: No response required from Applicant.
Q1.11.7.3	Network Rail Applicant	**Question:** **Operational impacts on the East Coast Mainline** The ES **[APP-071, paragraph 2.6.147]** states there would be minimal impact on operation of the ECML during the construction of the bridge foundations, piers and abutments. a) Can the Applicant define what is meant by 'minimal' and what the effects will be? b) Do NR agree with this statement? Explain with reasons. c) What elements of construction would have greater than 'minimal' effects on the operation of the ECML? Explain what these effects would be, how regularly and over what duration.
		Answer: a) The ECML will remain operational whilst bridge foundation, piers and abutments are being constructed. The minimal impacts as stated in the ES Chapter 2, The Scheme **[APP-071, paragraph 2.6.147]** refer to the ongoing track monitoring whilst the construction is taking place.

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		b) The two-party Overbridge Agreement (still to be finalised) between Highways England and Network Rail includes a requirement for the Applicant to submit and obtain Network Rail's approval to their Programme. This programme is to include possession requirements and thus Network Rail will be aware of these impacts. c) The element of the construction that would have greater than minimal effects on the operation of the ECML is the requirements to take possession for the following works: • Cadent gas main diversion (methodology of diversion has not yet been established). • Track Survey. • Install and remove track monitoring. • Erect protection scaffolding. • Beams, deck and parapet installation/construction. These works will be undertaken under weekend 'Rules of the Route' possessions that will all be secured through and approved by Network Rail in advance of being implemented. Rules of the Route possessions only take place when the track is not in use by the network operator. Works that would lead to greater than minimal effects will take place during these possessions and will therefore have no adverse impact on the operation of the ECML.
Q1.11.7.4	Applicant	**Question:** **Significant effects of construction traffic** The TAR **[APP-241] [APP-242]** does not describe and explain the criteria for establishing significant effects. Can the Applicant clarify what criteria were applied for establishing the significance of the effects of construction?
		Answer: The criteria of journey time along the route of the Scheme was considered to define the significance of the effects of construction. Given the traffic management measures applied and additional construction traffic, the increase in journey times on the two routes identified for comparing journey times and impact on traffic flow reasonably reflected the impacts of construction in the strategic model. The two journey times routes (i.e. the A1 between Tempsford and B645 junctions (approximately 9.5km) and the A421/A428 between Renhold junction to Scotland Road junction (approximately 30.5km)) did not exceed an increase of more than 4 minutes and 2 seconds in any direction or time period in any construction phase. There are no official

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standards or guidance or criteria, from traffic a perspective, to define the significance of impact for construction on highways. Normally journey time is the criteria which impacts the road users the most hence that is what we have reported on. Similarly, there are no official thresholds beyond which journey times are considered unacceptable during construction on a corridor. An additional journey time of maximum 4 mins in an otherwise normal journey time of approximately 26 mins is considered acceptable for the road users.

A summary table of modelled journey times of the two most significant construction phases are produced below, which demonstrate that the impacts of construction related delay in comparison to without scheme scenario is not very high or significant.

Description	Time Period	Direction	Phase 2				Phase 4			
			DM Journey Time (mm:ss)	CD Journey Time (mm:ss)	Difference (mm:ss)	% Difference	DM Journey Time (mm:ss)	CD Journey Time (mm:ss)	Difference (mm:ss)	% Difference
A421/A1/A428 (from Renhold Junction to Scotland Road Junction)	AM	EB	28:37:00	30:54:00	02:17	8%	28:37:00	30:51:00	02:14	8%
		WB	27:11:00	30:24:00	03:12	12%	27:11:00	30:41:00	03:30	13%
	IP	EB	26:03:00	28:37:00	02:33	10%	26:03:00	28:48:00	02:45	11%
		WB	26:07:00	29:43:00	03:36	14%	26:07:00	30:09:00	04:02	15%
	PM	EB	27:21:00	29:55:00	02:34	9%	27:21:00	29:05:00	01:45	6%

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		<table><tr><td></td><td></td><td>WB</td><td>28:52 :00</td><td>32:02 :00</td><td>03:10</td><td>11%</td><td>28:52 :00</td><td>32:33 :00</td><td>03:40</td><td>13%</td></tr></table> The impacts of the construction by different phases, on traffic flow and junction operation have also been assessed for all the relevant junctions using suitable traffic modelling software. The outputs of those models have demonstrated that the impact of construction phases on most of these junctions are marginally adverse or positive, in terms of junction capacity, average delays and queues which are the typical criteria considered for operational efficiency of junctions.
Q1.11.7.5	Local Authorities	**Question:** **Cumulative Effects** The ES **[APP-084, paragraph 15.3.22]** states that full details of the other development projects included within the traffic model (covering developments in Bedford, Central Bedfordshire, Huntingdonshire, Cambridge City and South Cambridgeshire) and the factors applied during the modelling process, are presented within the TA **[APP-241] [APP-242]**. Confirm whether or not you are satisfied with the shortlist of projects that have been considered.
		Answer: No response required from Applicant.
Q1.11.7.6	Applicant	**Question:** **Outline CTMP Real-time monitoring** The Outline CTMP **[APP-244]** explains that traffic monitoring sensors ma' be used to identify hot spots on key routes that can automatically notify Highways England control rooms and the travelling public. a) What are the circumstances under which these would be required? b) How would this information be shared with LHAs in real time?
		Answer:

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		a) The requirements and detail for the deployment of traffic monitoring sensors have not been determined at this early stage of the traffic management design. These will form part of the detailed design such that they can be deployed during the main construction works. Traffic monitoring sensors/systems may be used on main transit routes and diversion routes to monitor journey time, incidents, breakdowns and congestion and could consist of some of the following: • Data to Variable Message Signs showing for instance the current journey time through a section of the works. • Data to the Highways England Control Room and to other warning systems. • Alerts to Traffic Management crews to co-ordinate responses to issues on site. • Highlight congestion hotspots and allow traffic management programming and design to be developed as a data-led solution. • To identify regular/likely incident locations and develop an incident management and strategic recovery plan. • On diversion routes to identify the route on which vehicles travel or have travelled (using origin/destination data) so we can understand a customer's end to end journey experience, how many works they may have been through and if they used the approved diversion route. The final details of any monitoring will be determined during detailed design. b) Scope and method of sharing data is yet to be determined and will be addressed during detailed design through the established Technical Working Groups with the local highway authorities.
Q1.11.7.7	Applicant	**Question:** **Compliance with construction route restrictions** At US1 **[EV-001]**, the ExA observed many of those routes proposed to be permitted for use by construction traffic and subject to restriction for construction traffic. How would the proposed restrictions described in the outline CTMP **[APP-244, Section 3]** be enforced and what discussion has taken place with any organisation(s) responsible for such enforcement?
		Answer: Road traffic signs will be displayed on routes where construction traffic is restricted. These routes will be communicated to all site personnel through the site induction process, daily briefings and via noticeboards. All

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		subcontractors and suppliers will be instructed on the permitted and restricted routes as part of the procurement process. It is not planned for any external organisations to be responsible for enforcement. The construction management team would investigate any contraventions and implement suitable disciplinary measures.
Q1.11.7.8	Applicant	**Question:** **Construction road closure timings and frequency** a) Table 3.4 of the outline CTMP **[APP-244]** infers that full road closures would occur only at night. Can the Applicant confirm that this is the case? b) In order to better understand the impacts of full road closures on highway users and local communities please provide fuller detail on the anticipated number and frequency of such closures. c) Likewise, confirm whether access to businesses and homes on affected routes will be maintained during any road closures.
		Answer: a) Full road closures will be required both overnight during the week and over full weekends for specific activities. These closures will be implemented during off-peak periods. 1. Weekday nights Monday to Thursday (indicatively 2100 to 0600). 2. Weekends from Friday night (indicatively 2100) to Monday morning (indicatively 0600). b) The detailed design for the Scheme has not been undertaken and this is required to enable a construction programme to be developed to a sufficient level of detail to define the road closure requirements on the complex junctions. By way of an example, it is anticipated that for the side road works, similar to Toseland Road or Barford Road, where a new bridge is to be constructed off-line together with a new section of side road, in the order of 8 weekday night time road closures and 2 weekend road closures would be required during the construction and tie in of these new sections of side road. c) As detailed in the Construction Traffic Management Plan (CTMP) **[APP-244]** paragraph 3.9.7, a number of properties and businesses both to the north and south of the Black Cat Junction have already been identified as

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		likely to fall within the road closure limits. These residents and businesses will be kept fully informed of the road closure details and where a suitable alternative access is not available measures will be implemented to maintain access during the closures. This may include escorting vehicles through the closure when required. Where other residents and businesses are affected by road closures at this or other locations across the Scheme a similar approach would be adopted.
Q1.11.7.9	Applicant Local Highway Authorities	**Question:** **Frequency and timing of construction HGVs** At USI1 **[EV-001]**, the ExA observed, as stated in various RRs, many permitted construction routes appear to be residential in nature, particularly in and around St Neots. a) When does the Applicant intend to provide detail regarding the likely timing and frequency of HGVs using permitted routes? b) If the Applicant does not intend to provide this information for the Examination how can the ExA be satisfied of the assessment of adverse effects and mitigation of construction traffic? c) LHAs to comment
		Answer: a) The Outline Construction Traffic Management Plan (OCTMP) **[APP-244]** includes details of the logistics routes that will be used to supply plant and materials to the site. All suppliers will be instructed to ensure their vehicles use these routes as they approach the site. These logistics routes have been identified to keep the construction HGV traffic on the strategic road network where practicable and to exclude this traffic from various smaller roads and villages. The permitted routes through St Neots have also been limited to minimise the impact on this community while maintaining access to the full extents of the Scheme. The Scheme will source resources from multiple suppliers across the country and it is not possible at this stage to define which suppliers (local, national or international) will be used and the location from which they will source the projects requirements. An assessment has however been undertaken of the overall number of HGVs required to supply materials to the site. This data together with assumptions on the most likely approach directions was used by the Traffic Modelling team to develop the traffic forecasts for the Scheme during the various phases of the construction. The traffic

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		modelling for the permitted routes includes the expected construction related HGV movements required to supply the project. The Applicant does not intend to provide any further detail on the frequency and timing of HGVs using the permitted routes. b) The output from the traffic modelling, which includes an assessment of the construction related HGVs, has been used as a source of information for the environmental impact assessment, as reported in the Environmental Statement. The Applicant considers that the ExA can be satisfied that as part of this process an assessment of the adverse effects and mitigation of the construction traffic has been undertaken. The first iteration of the Environmental Management Plan **[APP-234]** sets out how mitigation measures will be implemented in relation to construction impacts. In addition, the OCTMP Section 3.3, sets out the detail for of the restricted routes for construction vehicles including the confirmation that the *"strategy for the restricted routes shown on the plans in Appendix C is to prevent construction vehicles from using through routes on the local road network as a convenient alternative to using routes within the site or the existing A428, A1 and A421. Access to and from some villages and towns is still allowed for light vehicles only so that facilities and businesses (e.g. suppliers, catering and hospitality) within those villages can still benefit from construction worker trade"* (paragraph 3.3.2 of the OCTMP).
Q1.11.7.10	Cambridgeshire County Council Huntingdonshire District Council South Cambridgeshire District Council	**Question:** **Local Highway Impacts** Clarify and expand on the bullet points raised in your RRs when submitting your LIRs.
		Answer: No response required from Applicant.
Q1.11.7.11	Applicant	**Question:** **Highway condition** How does the Applicant intend to ensure no damage occurs to the local highway network as a result of construction traffic using it for access during construction and how will this be secured?

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		Answer: The Outline Construction Traffic Management Plan (OCTMP) **[APP-244]** includes the plans showing the logistics routes that will be used by construction vehicles to access the works. Most of these logistics routes are main trunk roads that from part of the Strategic Road Network with plant and materials delivered directly from these routes to the main compounds or via site access points directly off the trunk roads to the internal site haul routes that will be constructed to provide access to the offline sections of work. The Applicant will undertake condition surveys of local roads at all access points used by construction vehicles, including any crossings of the local roads of haul routes, prior to the start of construction. As a minimum these areas will be restored to the same condition upon completion of the scheme. The case for urgent intervention in these areas will be defined in collaboration with the LHA's. The Applicant proposes to document this position within the Traffic Management Plan in accordance with Requirement 11.
Q1.11.7.12	Central Bedfordshire Council	**Additional Question:** **Outline CTMP Clarification** a) At Open Floor Hearing 1, CBC raised concerns relating to likely traffic impacts on Station Road, Tempsford. Clarify with reasoning if these concerns relate to the construction of the Proposed Development, or those associated with approved archaeological excavations or both. b) If relating to archaeological excavations explain how this is within the scope of the Proposed Development. c) Provide any relevant information relating to the Planning Permission and conditions referred to in your representation at Open Floor Hearing 1.
		Answer: Question is for other parties not including the applicant. No response required from Applicant.
Q1.11.7.13	Applicant Central Bedfordshire Council	**Additional Question:** **Additional monitoring and community liaison support** In light of the representation made at the Open Floor Hearing 1 provide a joint position statement explaining why

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		additional monitoring and community liaison support is required at CBC, to mitigate, manage and monitor the impacts of traffic during the construction of the Proposed Development. Provide details of this measure and how it would be secured.
		Answer: The Applicant will seek to engage with Central Bedfordshire Council (CBC) to prepare a joint statement setting out respective positions on monitoring and community liaison for submission at Deadline 3, in line with the timescales for preparation of the Statement of Common Ground. In summary, the Applicant has committed to the Scheme being supported by dedicated customer and communications teams including the Community Relations Manager and a Traffic Management Officer (as set out in the First Iteration Environmental Management Plan **[APP-234]**), which will minimise any burden on Local Authorities, and therefore no additional community liaison support is considered necessary. In addition, Highways England would normally expect to hold regular, frequent Traffic Management forum meetings with all relevant bodies including the local highways authorities during the course of construction works. These meetings often start by being weekly, moving to fortnightly or monthly as the project progresses and the work and routines become better understood. The Applicant would establish the CBC point of contact and would work with CBC and the appointed contractor to minimise impacts and support local connectivity and ease of movement. Notwithstanding this, the Applicant will continue to engage with Central Bedfordshire Council to understand the nature of their concerns and discuss what further support is sought from Highways England, in order to inform submission of the joint position statement.
Q1.12	**Historic Environment**	
Q1.12.1	**Methodology**	
Q1.12.1.1	The Applicant Local Authorities Historic England	**Question:** **Methodology and mitigation** The construction of the Proposed Development would result in significant adverse effects on designated heritage assets and archaeological remains, including from the Iron Age and Roman times **[APP-075]**. a) In light of the residual adverse effects to the historic environment, are parties and Applicant satisfied that the Proposed Development meets the policy requirements regarding sustaining and enhancing the historic environment in the NPS NN (paragraphs 5.120-5.144)?

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		b) Is the proposed mitigation in the ES adequate, given the residual adverse effects **[APP-075, paragraphs 6.9.286 and 6.9.287]**?
		Answer: a) Section 5.5 and Appendix A of the Case for the Scheme [APP-240] set out an assessment of the Scheme against the historic environment paragraphs set out in the NPS NN. The requirement to 'sustain and enhance' the historic environment is detailed in paragraph 5.130 of the NPS NN which states: "The Secretary of State should take into account the desirability of sustaining and, where appropriate, enhancing the significance of heritage assets, the contribution of their settings and the positive contribution that their conservation can make to sustainable communities – including their economic vitality. The Secretary of State should also take into account the desirability of new development making a positive contribution to the character and local distinctiveness of the historic environment. The consideration of design should include scale, height, massing, alignment, materials, use and landscaping (for example, screen planting)." As noted in Paragraph 5.5.32 of the Case for the Scheme [APP-240] "although no specific enhancement measures for particular heritage assets have been incorporated into the Scheme, Chapter 6, Cultural Heritage of the ES [TR010044/APP/6.1] has identified that at least seven designated built heritage assets or scheduled monuments will experience beneficial effects from the Scheme by virtue of a reduction in traffic and traffic noise on the existing A428... These beneficial impacts also weigh in favour of the Scheme in the balance of heritage impacts and Scheme benefits." The Case for the Scheme [APP-240] also sets out at Paragraph 5.5.61 that in relation to Brook Cottages, "In relation to Paragraph 5.130 of the NPS NN, the conservation of the cottages which are accessible only from the A1 northbound would be likely to make little contribution to sustainable communities or the economic vitality of the community". Taking into account the above, the Applicant is satisfied that the Scheme meets the policy requirements in the NPS NN regarding sustaining and enhancing the historic environment. b) The Applicant considers that the proposed mitigation is adequate. All impact levels have been considered with mitigation in place. As stated in Design Manual for Roads and Bridges (DMRB) LA106 (Cultural Heritage Assessment), loss of heritage without a programme of investigation to understand the cultural heritage resource is the worst option. LA106 further states that "Programmes of investigation deliver mitigation by addressing the

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		adverse effect of a project on archaeology even when the cultural heritage resource is destroyed or altered" (DMRB LA106 Section 3, Note 1 to para 3.13.2). Mitigation measures for each site are provided in the Archaeological Mitigation Strategy [APP-238] (AMS) in Table 5-1 and in further detail in Appendix D. As detailed in Part 2 of the AMS, the primary aim of the Strategy is to maximise knowledge gain. The objective is to excavate those sites with intrinsic or group value, which will add to the corpus of knowledge for the region. This approach is not new, and has been used on other major linear projects, such as High Speed 2. Compliance with the AMS is secured through Requirement 9 of the draft Development Consent Order (dDCO) [APP-025], which requires the authorised development to be carried out, operated and maintained in accordance with the AMS. Each mitigation area has been reviewed to determine what it may contribute to the research questions posed in the regional research agendas, and arising from regional and local knowledge gaps and the results of the evaluation. Of the archaeological sites, the majority will be mitigated via more intensive excavation (sites of intrinsic value, such as those in Fields 9, 44, 64-65 and 77) or through standard excavation techniques (sites of group value or key sites, such as those in Fields 53, 73 & 74, 93 and 97). Three sites will be subject to less intensive sampling, although features examined will be to the same level as for group/key sites. These are Site 1 in Field 3, where most of the site will be preserved under the bund ("Further sampling of linear features (209107, 211603, 211609) and preservation under bund"); Site 20 in Fields 75-6, where the enclosure will be excavated but other features, such as ditches and the existing field access track will be sampled ("Sample ditch and excavate enclosure. Trial trench across existing track"); and Site 28 in Field 90, where a string settlement would be investigated. Again, enclosures would be excavated, but the string ditch would only be sampled ("Sample to compare with other examples"). We continue to work with the archaeological advisors to all the councils to work towards development of the agreement of the areas to be mitigated. As part of this, changes are being made to update the AMS, following comments received from the councils. For the listed milestones, the mitigation measure to remove, store for the duration of the construction works and reinstate in a position as close to the existing location as possible is an acceptable mitigation measure that has been used on other schemes, including the A14 Cambridge to Huntingdon scheme. This has been discussed and agreed with Historic England and the conservation officer for South Cambridgeshire District Council. Paragraphs 2.6.9 to 2.6.11 of Chapter 2, The Scheme of the Environmental Statement [APP-071] confirm that the Environmental Impact Assessment of the Scheme has been undertaken on a reasonable worst-case scenario. For Brook Cottages this is in relation to demolition of the Grade II listed building. The assessment has been

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		undertaken on the basis that the building will be demolished, resulting in a total loss of significance. The Level 3 recording is considered to be an appropriate level of record. The detail is contained in Section 12 of the Archaeological Mitigation Strategy [APP-238]. This is in line with DMRB, which states that mitigation measures can include "relocation, photographic or drawn to scale surveys in the case of historic buildings" (DMRB LA106 Section 3, Note to para 3.13.1, point 2). It should be further noted that each mitigation site will have a Site Specific Written Scheme of Investigation produced by the archaeological contractor, which will be agreed by the relevant Curator. The academic advisory panel and Historic England are in broad agreement with the approach to mitigation for the Scheme.
Q1.12.1.2	Applicant Historic England Bedford Borough Council	Additional Question: Alignment with National and Local Policy How is the Black Cat Junction option selection process and the preferred option aligned with relevant Policy documents, particularly the NPS NN, the NPPF, and the Bedford Local Plan 2030.
		Answer: The Case for the Scheme [APP-240], in Appendix A provides the Applicant's National Policy Statement for National Networks (NPSNN) accordance table. Rows 5.131 and 5.133 explain how the Scheme is in accordance with the NPSNN. Row 4.27 of the NPSNN accordance table notes that the NPSNN requirement for all schemes to be subject to an options appraisal was addressed because the design options were considered and appraised as part of the Scheme's development. This is also explained in Chapter 3, Assessment of Alternatives of the Environmental Statement [APP-072]. NPSNN, paragraph 4.26 requires applicants to comply with all legal requirements and any policy requirements set out in the NPS on the assessment of alternatives. These matters are addressed in Row 4.26 of the NPSNN accordance table. The policy requirements in NPSNN paragraph 4.26, in the context of this question and which are relevant to the Scheme, relate specifically to heritage matters. Paragraph 5.131 of the NPSNN requires the Secretary of State to give great weight to conservation of heritage assets. It goes on to say that substantial harm to or loss of a grade II Listed Building should be exceptional. At paragraph 5.133 of the NPSNN it states that where the proposed development will lead to substantial harm to or total loss of significance of a designated heritage asset, the Secretary of State should refuse consent unless it can be demonstrated that this is necessary to deliver substantial public benefits which would outweigh that total loss of significance or substantial harm.

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		The Cultural Heritage assessment reported in Chapter 6, Cultural Heritage of the Environmental Statement [APP-075] finds that the Scheme will result in large adverse effects amounting to substantial harm in one case only, which is in respect of the impact on Brook Cottages. The Applicant also concluded that the relocation of Brook Cottages (if feasible) would not reduce this 'substantial' harm to 'less than substantial' harm. Therefore, the Applicant considered alternative design solutions which would avoid the demolition of Brook Cottages, these are presented in the Black Cat Junction Design Options [APP-247]. As explained in the Black Cat Junction Design Options [APP-247], due to the proximity of Brook Cottages to the existing Black Cat roundabout and A1 carriageway and the scale and complexity of delivering a new junction at Black Cat within a highly constrained location, no suitable design solution was identified to enable the Scheme to be delivered with the retention of Brook Cottages in situ. In this respect, the demolition of Brook Cottages is considered necessary to deliver the Scheme. Row 5.133 of the Applicant's NPSNN accordance table [APP-240], Appendix A, explains that demolition of Brook Cottages is necessary in order to deliver the substantial public benefits of the Scheme and that these benefits outweigh the substantial harm to Brook Cottages. Paragraph 5.5.33 to 5.5.63 of the Case for the Scheme explains this in further detail, including the Applicant's proposals for the potential relocation of Brook Cottages (if feasible) and its recording prior to demolition, albeit this would not reduce the 'substantial' harm to Brook Cottages. The National Planning Policy Framework (2021) (NPPF) echoes the policies set out in the NPSNN. Noting that harm or loss of significance of a designated heritage asset should require clear and convincing justification, and also that substantial harm to or loss of a grade II Listed Building should be exceptional. Similarly, where substantial harm or loss would occur, the NPPF also states that local planning authorities should refuse consent unless it can be demonstrated that the substantial harm or loss is necessary to achieve substantial public benefits that outweigh this. The Bedford Local Plan 2030 also accords with this policy approach. During the Issue Specific Hearing on 18 August 2021 (ISH1), the Examining Authority asked the Applicant to provide a summary narrative of the criteria considered in the assessment of alternatives for the Black Cat junction and alignment of the A1 in the immediate and wider area, with particular reference to historic environment, flood risk and flood plain compensation, land take and effects on other residential and commercial uses, the restoration of the quarry and on the gas main to the south of the existing roundabout (Action Point 4). The Applicant has provided a detailed response to this Action Point at Appendix B to 'Applicant response to actions arising from Issue Specific Hearing 1' [TR010044/EXAM/9.15]. The Applicant's Written Summary of Oral Representations at ISH1, in section 2.2, also provides a summary regarding the option selection process for Black Cat Junction. In summary, the Applicant recognises that the loss of Brook Cottages would give rise to substantial harm. Accordingly, and in accordance with national and local policy, the Applicant considered whether the relocation of Brook Cottages (if feasible) could lead to less than substantial harm, or whether there was an alternative design solution which would avoid the loss of Brook Cottages. The Applicant concluded that relocation of Brook Cottages

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		would not reduce the substantial harm, and no suitable design solution was identified to avoid the demolition of Brook Cottages. Therefore, the Applicant considers that the demolition of Brook Cottages is necessary to deliver the Scheme. In addition, the Applicant considers that the substantial public benefits afforded by the Scheme outweigh the substantial harm to Brook Cottages.
Q1.12.2	**Brook Cottages**	
Q1.12.2.1	The Applicant Historic England Bedford Borough Council	**Question:** **Demolition of Brook Cottages** The Proposed Development would require the demolition of a Grade II listed building, a Designated Heritage Asset, causing substantial harm and resulting in a permanent Large Adverse effect **[APP-075, Table 6-6]**. This is caused by the proposed Black Cat Roundabout junction, which was subject to consultation and refinement prior to the submission of the application **[APP-178] [APP-247] [APP-035]**. a) What is HistE's view on the Applicant's justification for the proposed demolition of Brook Cottages? b) Applicant, when will you know whether it is technically feasible to re-locate Brook Cottages, and whether a museum is willing to accept them **[APP-240, Appendix E]**? c) Has any consideration been given to re-locating Brook Cottages nearby, and would this be more effective mitigation and reduce the residual adverse effect?
		Answer: a) This is for Historic England to answer. The Applicant has engaged with Historic England throughout the application process regarding the requirement for the demolition of Brook Cottages and the approach to both the required survey and investigations into relocation of the building. b) The Applicant has been working with the Museum of East Anglian Life on potential relocation of Brook Cottages to the museum site. However, to determine the feasibility of this it is necessary to perform intrusive surveys on the building frame. To date, consent for this work has not been granted by the property owners due to the interests of the residential occupier of the property which the Applicant is respectful of. Section A5.4 within Appendix E of the Case for the Scheme **[APP-240]** sets out the efforts that have been made to gain access to Brook Cottages to undertake the structural survey. Substantial efforts to gain access have continued since the application was submitted. This will be pursued via the owners recently appointed an agent.

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		Whilst the Applicant continues to negotiate access to undertake the surveys, a worst-case scenario has been assumed which would result in surveys being undertaken upon possession of the property once development consent has been received. c) Consideration has been given to the benefits and disbenefits of re-locating Brook Cottages as a dwelling within the area required for the construction and operation of the Scheme versus re-locating it to a museum. This is set out in Appendix E of the Case for the Scheme **[APP-240]**, and set out in summary below. Retention of Historic Significance - Should Brook Cottages be relocated nearby to continue its existing residential use, it would require significant works to bring it up to current housing standards for habitable use. The building would need to contain new welfare facilities in order to afford habitable accommodation. As such, the existing plan form of the building could not be retained, as it is not of sufficient size. It is most likely that the two dwellings would need to be reconfigured to form one larger property in order to be viable for sale as residential use in the open market. Listed Status - While relocating Brook Cottages and retaining its existing residential use would retain elements of the historic fabric, it is considered that the extent of works required to make it habitable and viable for residential use on the open market would erode its historic interest to such an extent that it would not meet the criteria for listing. It is important to note, however, that neither option (relocated nearby as a dwelling, or relocating to a museum) will reduce the Scheme effects since the listed building will effectively be 'demolished' in the process of moving it with associated loss of fabric and its removal from its setting and context which currently contributes to its significance. Therefore, both options result in substantial harm to the listed building. The re-location of the building to the museum is intended to provide additional public benefit through increased public exposure and appreciation of the building. This would not be the case to the same degree if the building were to be re-located as a private dwelling. In conclusion, whilst neither option for re-locating the structure results in a reduction of the residual adverse effect, the preferred option for re-locating Brook Cottages is to re-locate it to a museum as this affords greater opportunity to retain the heritage significance of the rebuilt structure when compared with re-location as a dwelling. Furthermore, there is greater potential to achieve public benefit through increased public appreciation of the building as part of a museum, which would not be gained through its use as a private dwelling.
Q1.12.2.2		**Question:**

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	The Applicant Historic England Bedford Borough Council	**Black Cat Junction Options** a) How was the historic environment (Brook Cottages, archaeological remains, and Milestone and Mileposts) weighted in the Route and Junction option selection process? b) Applicant, why were the junction option plans that were consulted upon changed to include the demolition of Brook Cottages, and were these revised options subject to consultation, including with BBC / HistE / the public **[APP-072, Table 3-4]**? c) Applicant, was consideration given to moving the proposed Black Cat junction a short distance to the east and re-aligning the A1 from just north of South Brook to just north of Rockham Ditch, so as to avoid the need to demolish Brook Cottages? d) Applicant, what consideration was given to altering the alignment of the A1 from south of the River Great Ouse to north of South Brook, to avoid the demolition of Brook Cottages, and improve its setting and immediate environment (Paragraph 5.130 NPS NN)? e) Are BBC and HistE satisfied with the Applicant's design approach to the alignment of the A1 and the Black Cat junction, with respect to the adverse effects on Brook Cottages?
		Answer: a) The historic environment was a component in the option identification and selection process with the environmental impacts being qualitatively assessed against the Transport Analysis Guidance (WebTAG). For further consideration of the options investigated at Black Cat junction please refer to the Black Cat Junction Design Options report **[APP-247]**. b) As stated in the Black Cat Junction Design Options report [APP-247]; the three junction options were presented in the non-statutory consultation brochure which stated that Option A "may affect the setting of the listed building to the north of the Black Cat roundabout" and Options B and C "may result in the removal of the Grade II listed building to the north of Black Cat roundabout". The public consultation on the Black Junction options identified a preference for Option C, which was presented in the non-statutory consultation as one of two options that would result in the demolition of Brook Cottages. This was the option taken forward as part of the Scheme. As set out in Paragraph 4.2.2 of the Black Cat Junction Design Options **[APP-247]** following the non-statutory consultation, all three options were further reviewed which confirmed that all three options resulted in the need to

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		demolish Brook Cottages. The outcome of the further review led to the Applicant developing an option, known as Option C+, that sought to develop the preferred public option from non-statutory consultation whilst retaining Brook Cottages. However, as described in the Black Cat Junction Design Options **[APP-247]**, the layout resulted in a highly complex junction arrangement with significant technical and safety issues. The junction option plans that are set out in Table 3-4 of Chapter 3, Assessment of Alternatives **[APP-072]** are principally the same as the options that formed part of the non-statutory consultation. The difference is that the non-statutory options were presented in schematic format whereas the more detailed junction plans were developed for the purpose of undertaking the further review referred to above. To confirm, the Applicant did not consult on the more detailed junction plans as they are the same as the schematic drawings that formed part of the non-statutory consultation. The need for demolition of Brook Cottages with Option C was made established and presented at non-statutory consultation before that preferred option was chosen. Following this, the Applicant further assessed and re-confirmed the need to demolish the cottages and this presented was at Statutory Consultation. Bedford Borough Council, Historic England and the public were consulted as part of this process. c) The Applicant considered moving the junction further to the east, however determined the negative impacts outweighed other impacts associated with the Scheme. These are detailed in Action 4 of the 9.15 Applicant response to actions arising from ISH1. d) The Applicant considered moving the junction further to the east, however determined the negative impacts outweighed other impacts associated with the Scheme. These are detailed in Action 4 of the 9.15 Applicant response to actions arising from ISH1. e) Bedford Borough Council and Historic England have been consulted on the proposals, including the need for the removal of Brook Cottages. The Applicant is continuing to develop proposals to mitigate for the loss of Brook Cottages as far as possible.
Q1.12.2.3	The Applicant Historic England Bedford Borough Council	**Question:** **Black Cat Quarry** The Black Cat Quarry is located to the east of the existing roundabout and is referenced at various places within the ES **[APP-076, paragraph 7.6.90]**. a) Applicant, how was the operation of the Black Cat Quarry considered in determining the preferred junction option

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		at Black Cat? b) HistE and BBC to comment. c) When did the Applicant know that the Black Cat Quarry was to be closed, and would a different design approach have been taken had the quarry been closed rather than operating?
		Answer: a) The Applicant has not considered the operation of the Black Cat quarry in the determination of the preferred junction option. The Applicant has designed and assessed the Scheme with the restoration of the quarry site being in place. b) This part of the question is not for the Applicant to respond to. The Applicant will provide any response to the points raised at Deadline 3. c) The Applicant has been aware of the completion of quarrying activities and restoration since the operator's planning application was submitted (Highways England was a consultee) prior to the options development stage of the project. The Black Cat Quarry has not influenced the design approach as the Applicant has considered the restored site to be completed before the Scheme's start of works. Please refer to the response provided at Q1.11.2.2 regarding the Black Cat junction constraints.
Q1.12.3	**Milestone and Mileposts**	
Q1.12.3.1	Historic England Cambridgeshire County Council Huntingdonshire District Council South Cambridgeshire District Council	**Question:** **Removal and re-location** The Proposed Development would entail the removal and subsequent relocation nearby of designated heritage assets, causing a permanent moderate adverse effect **[APP-075, Section 6.9]**. CCC, HDC and SCDC, and HistE, what is your view on the removal and subsequent re-location of the Milestone and Mileposts?
		Answer: No response required from Applicant.
Q1.12.4	**Archaeological Remains**	

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Q1.12.4.1	The Applicant Historic England Local Authorities	**Question:** **General** There are a number of archaeological remains, in and close to the Order Limits, which would be adversely affected by the construction of the Proposed Development. Furthermore, the proposed diversion of a gas pipeline to enable the scheme to proceed would entail disturbance to archaeological remains **[APP-158]** a) Applicant, explain how the ES has considered the effects of the proposed pipeline diversion on archaeological remains? Is this the same approach for archaeological remains as for the remainder of the Proposed Development? b) Applicant, provide more detailed justification for concluding moderate adverse residual effects from the Proposed Development on the archaeological remains **[APP-075, Section 6.9]**? HistE and LAs to comment. c) Applicant, what consideration has been given to the of the effect of the Proposed Development on all these remains, combined? HistE and LAs to comment. d) The ES states that for Phase 1 of the trial trench evaluation, the original scope of the works required 771 trenches, but 95 trenches were de-scoped and removed **[APP-173, paragraph 4.1.2]**. What is the justification for the reduction in scope of the works and what effect would it have on the evaluation, including spatially? HistE and LAs to comment. e) Are parties satisfied with the approach, scope and conclusions of the archaeological assessment, and proposed mitigation? f) BBC, you state that the focus of the assessment seems to be 'changes to the visual setting of the monument' **[RR-008a, paragraph 4.5]**. Clarify whether you are referring to a specific monument; if so which one? Or are you referring to the assessment of all assets in general?
		Answer: a) The approach for assessing effects of the proposed Cadent high-pressure pipeline diversion on archaeological remains is the same as for the remainder of the Proposed Development. Paragraphs 2.6.9 to 2.6.11 of Chapter 2, The Scheme of the Environmental Statement [APP-071] confirm that the Environmental Impact Assessment of the Scheme has been undertaken on a reasonable worst-case scenario (comprising a construction programme which includes advanced works), and paragraph 2.6.31 of Chapter 2, The

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		Scheme of the Environmental Statement [APP-071], identifies that works associated with diverting the Cadent high-pressure gas main diversion would need to be carried out during the advanced works phase of Scheme construction. Collectively, these paragraphs confirm that the Applicant's Environmental Impact Assessment has fully accounted for the planned diversion works to the Cadent high-pressure gas main should it occur after development consent is granted. Furthermore, paragraph 1.3.3 of the Screening Assessment of proposed gas pipeline works for the purposes of section 20 of the Planning Act 2008 [APP-158], confirms that the Environmental Statement has assessed the likely effects of the Scheme as a whole (which includes the planned diversion works to the Cadent high-pressure gas main). Paragraphs 1.4.1 to 1.4.3 of the Screening Assessment for the proposed gas pipeline works for the purposes of section 20 of the Planning Act 2008 [APP-158], state that the only factor likely to give rise to significant effects as a result of the Cadent high-pressure gas main diversion is the impact on the high heritage value archaeological remains. This goes on to say that a planning application for permission to excavate the archaeological remains has been submitted to Central Bedfordshire Council. Following submission of its Development Consent Order application, the Applicant can confirm that planning consent to undertake excavation of the archaeological remains has been approved by Central Bedfordshire Council and that these works are now being undertaken on site. Further detail on the assessment process for the Cadent high-pressure gas main can be seen in the response to Question 1.8.1.2. b) Twenty heritage assets will have a moderate adverse effect. Seventeen of these are on archaeological sites and three are on listed milestones. The impact assessment has been undertaken using DMRB LA104 Environmental Assessment and Monitoring. This forms the methodology for assessing impacts for the EIA process for highways schemes. However, this has not been used in isolation. Paragraphs 6.3.15 and 6.3.16 of Chapter 6, Cultural Heritage of the ES [APP-075] detail the other guidance documents that have informed the assessment. The impact assessment has also utilised the requirements of the National Policy Statement for National Networks (NSPNN) and the National Planning Policy Framework (NPPF) which require the significance of heritage assets to be assessed. This has been completed for each affected heritage asset and archaeological site. The impact assessment process considers the value of each asset (taking the heritage significance of each asset into account), then, independently of the asset's value, a magnitude of impact is identified. These levels are defined in Table 6.2 of Chapter 6, Cultural Heritage of the ES [APP-075]. The significance of effect is defined by taking the value and the magnitude together. This methodology is in line with the recently released guidance from the Institute of Environmental Management and Assessment (IEMA), the Chartered Institute for Archaeologists (CIfA) and the Institute of Historic Building

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		Conservation (IHBC) on the Principles of Cultural Heritage Impact Assessment in the UK, published July 2021 (https://file-us.clickdimensions.com/iemanet-ay0iq/files/j30361_iema_principlesofchia_v8.pdf?1626689282662&_cldee=Z2FyZXRoLmNvdWdobGluQGFlY29tLmNvbQ%3d%3d&recipientid=contact-0ac8b38d59a1e911a968000d3a29fb7a-fb4fc31f3d894e2b8f37567c761d717a&esid=cac44ff3-9ee8-eb11-bacb-000d3a4afb17). This document provides guidance in regard to the principles of cultural heritage impact assessment. These comprise a) understanding cultural heritage assets; and b) evaluating the consequences of change. The steps to follow are the same as enshrined in DMRB, namely describing the significance of each asset and defining its importance, assigning a magnitude of impact, and drawing these together to 'weight the effect'. As detailed in paragraph 6.9.1 of Chapter 6, Cultural Heritage of the ES [APP-075], the prediction of impacts and the assessment of effects (and their significance) on cultural heritage associated with construction and operation of the Scheme has taken account of the effectiveness of both the embedded and essential mitigation measures. The way in which the moderate adverse effects have been reached for individual assets is detailed in Section 6.9 of Chapter 6, Cultural Heritage of the ES [APP-075]. However, examples are provided below to provide clarity. A number of archaeological sites extend outside of the Scheme boundary, including Site 3 in Field 9, Site 7 in Field 44 and Site 15 in Field 64-65. With mitigation (excavation) in place, the magnitude of impact of these sites has been assessed as moderate adverse. This is defined in DMRB LA104 (see Table 6.1 of Chapter 6, Cultural Heritage of the ES [APP-075]) as "Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements". For these sites, the criteria that has been applied is the "partial loss of/damage to key characteristics, features or elements." While the sections of the sites within the Proposed Development will be lost, other parts of the sites will be retained. Other sites experiencing a moderate adverse effect will result in loss of sites, but this is not considered to be total loss of significance, as the stated mitigation measures will ensure there is a record of the sites. The listed milestones and mileposts would be affected by the modifications made to the roads on which they sit. As the milestones and mileposts would be removed, stored and relocated to a position as close to its existing location as possible, this mitigation would reduce the impact on its significance, which is why the magnitude of minor, combined with their high value, gives a resultant significance of effect of moderate adverse. However, the mitigation has been accepted by Historic England and the Conservation Officer, and follows that utilised on the A14 scheme. All remains with a moderate adverse significance of effect will be mitigated. As stared in DMRB LA106, loss of heritage without a programme of investigation to understand the cultural heritage resource is the worst option.

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		LA106 further states that "Programmes of investigation deliver mitigation by addressing the adverse effect of a project on archaeology even when the cultural heritage resource is destroyed or altered" (DMRB LA106 Section 3, Note 1 to para 3.13.2). c) Due to the nature of archaeological remains it is not possible to consider the potential effect on them as a combined asset. The archaeological remains within the Order limits which have been identified through both desk-based research and archaeological evaluation span thousands of years. Their significance lies in the contribution they make to the understanding of the specific period(s) they date to, how their presence informs on past human interaction with the landscape, and about settlement activity. While the relationship between individual sites from the same period (such as the Iron Age or Roman) is also of interest, assessing the effect on all the remains, as a whole, would not provide any meaningful conclusions. d) The 95 trenches were descoped due to access, ecological constraints or water logging in localised ground conditions. As stated in paragraph 6.4.9 of Chapter 6, Cultural Heritage of the Environmental Statement [APP-075]: "Further details regarding these limitations are presented in Appendix 6.6, Appendix 6.7 and Appendix 6.8 of the Environmental Statement [TR010044/APP/6.3]; however, it is not considered that these modifications and restrictions have compromised the ability to understand the archaeological potential of land within the Order Limits or the ability to assess the effects of the Scheme on buried archaeology." Where possible, trenches were realigned or moved to ensure coverage of all areas to be evaluated. Some evaluation trenches could not be fully completed due to Covid-19. These areas (such as Field 54) form mitigation areas to ensure the archaeology is properly recorded. e) The Applicant is satisfied with the approach, scope and conclusions.
Q1.12.4.2	The Applicant Historic England Local Authorities	Question: Archaeological Mitigation Strategy a) BBC, submit the Archaeological Design Brief prepared jointly by BBC, CBC and CCC, mentioned in RR [RR-008a] and at Appendix B [APP-238]. b) Applicant, provide a brief summary of the relevance of the Archaeological Design Brief to this Examination, with respect to NPS NN and local planning policies.

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		c) BBC, provide proposed wording for Requirement 9. d) Applicant to comment. e) CCC, HDC, SCDC, CBC and HistE, what are your views on the scope of the archaeological mitigation strategy [APP-238] and its response to the joint Archaeological Design Brief?
		Answer: b) It is assumed that the 'Archaeological Design Brief' referred to is the "Joint Cambridgeshire/Bedfordshire Brief for A Programme of Archaeological Investigation" produced by Cambridgeshire County Council, Central Bedfordshire Council, and Bedfordshire Borough Council. The NPSNN, NPPF and most of the local planning policies contain similar information with regards to the work required when a development will result in loss (total or partial) to a heritage asset's significance. The policies require recording of heritage significance which will be lost, and for the resulting report to be publicly available. Of these policies (national and local) only the Bedford Borough Local Plan 2030 includes a requirement for a design brief. Policy 41S states "This assessment and recording must be undertaken by a suitably qualified specialist in accordance with a design brief set by the Council's Historic Environment Team." As stated in Paragraph 1.1, the NPSNN "sets out the need for, and Government's policies to deliver, development of nationally significant infrastructure projects (NSIPs) on the national road and rail networks in England." As an NSIP, the Scheme must follow the NPSNN. The NPSNN does not require archaeological mitigation to be set out in a brief from the local planning authorities. Notwithstanding this, the required changes to the Archaeological Design Brief are agreed, and the Applicant is happy to append this to the Archaeological Mitigation Strategy (AMS) [APP-238]. Appendix B to this document (the AMS) has been included to facilitate this. The requirements of the Archaeological Design Brief, such as the research questions and the percentages of features to be investigated, have been utilised when developing the AMS, and are in line with the requirements of the Brief. The full text of the relevant from NPSNN and the local policies follows: NPSNN Paragraph 5.139: "A documentary record of our past is not as valuable as retaining the heritage asset and therefore the ability to record evidence of the asset should not be a factor in deciding whether consent should be given."

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		Paragraph 5.140: "Where the loss of the whole or part of a heritage asset's significance is justified, the Secretary of State should require the applicant to record and advance understanding of the significance of the heritage asset before it is lost (wholly or in part). The extent of the requirement should be proportionate to the importance and the impact. Applicants should be required to deposit copies of the reports with the relevant Historic Environment Record. They should also be required to deposit the archive generated in a local museum or other public depository willing to receive it." **Bedford Borough Local Plan 2030. Policy 41S: Historic Environment and Heritage Assets** Where applications are permitted which will result in (total or partial) loss to a heritage asset's significance (including where preservation in situ of buried archaeological remains is not necessary or feasible), applicants will be required to arrange for further assessment of and recording of this significance in advance of, and where required, during development/works. This assessment and recording must be undertaken by a suitably qualified specialist in accordance with a design brief set by the Council's Historic Environment Team. The work might include: - archaeological and/or historic building fieldwork, - post-excavation/recording assessment, analysis, interpretation, - archiving with the local depository, and - presentation to the public of the results and finds in a form to be agreed with the Council. As a minimum, presentation of the results should be submitted to the Bedford Borough Historic Environment Record and where appropriate, will be required at the asset itself through on-site interpretation. **Huntingdonshire's Local Plan to 2036. Policy LP34** Archaeology. Where possible and appropriate the preservation of archaeological remains in-situ should be ensured. Where this is either not possible or not desirable, as agreed with the Council, provision must be made for comprehensive recording, analysis of the results and publication. There will also be a requirement for preservation and where practical enhancement. **South Cambridgeshire Local Plan 2018. Policy NH/14: Heritage Assets** While the policy does not include any relevant text, the Local Plan states in Paragraph 6.57: "Where development resulting in the loss of a heritage asset is permitted, the developer will be required to record and advance the understanding of the heritage asset to be lost. The results of assessments and investigations which are required and collected as part of development management are of public interest and will be made accessible, normally through the Cambridgeshire Historic Environment Record." Central Bedfordshire Council's Core Strategy and Development Management Policies does not contain any relevant policies.

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		d) It is assumed the Applicant cannot comment until BBC have provided a response to part c. However, the AMS contains information pertaining to the requirement for Site Specific Written Schemes of Investigation to be produced and agreed with the Curators, as well as details of the broad methodology for fieldwork, post-excavation assessment and analysis, and publication and archiving. This is in line with the "Joint Cambridgeshire/Bedfordshire Brief for A Programme of Archaeological Investigation". As a consequence, Requirement 9 provides sufficient information to ensure that all required archaeological work will be undertaken.
Q1.13	**Landscape and Visual Effects**	
Q1.13.1	**General**	
Q1.13.1.1	Historic England Local Authorities	**Question:** **Methodology** Within a predominantly rural landscape the ES states that the proposed scheme would have significant adverse residual effects, both during construction and operation **[APP-076, section 7.9]**. a) LAs, are you content with the Landscape and Visual Impact Assessment (LVIA) methodology, including the locations of viewpoints and photomontages **[APP-123 – APP-137]**? b) HistE's views are sought in light of heritage assets that are present, including scheduled monuments such as a Bronze Age barrow and medieval moated sites **[APP-075, Paragraph 6.6.15]**, within the affected landscape.
		Answer: No response required from Applicant.
Q1.13.2	**Visual Impact**	
Q1.13.2.1	Applicant Local Authorities	**Question:** **Design and visual appearance** Applicant, in the Schedule of Mitigation [APP-235, EMB – LV8] you have identified *"Factoring landscape and visual considerations into the form and design of permanent structures (for example footbridges)"* as a commitment. The ExA notes that there is limited detail about the design and visual appearance of permanent structures, besides the

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		engineering sections **[APP-019]** and the limited visuals in the ES **[APP-072]**. a. In the absence of this information, please elaborate on how the design and visual appearance of the various permanent structures of the Proposed Development such as the grade separated junctions, bridges, gantries and signs, have been considered in LVIA? b. Local Authorities to comment.
		Answer: Information about the visual appearance and location of structural elements is held in the Application within the defined parameters of the Scheme to assess good design and to reach sound judgements on the likely significant landscape and visual effects and consideration of the necessary mitigation. The amount of design information provided is consistent with other approved schemes. To further assist the ExA in advising the SoS on matters relating to visual appearance, in particular scale, height, massing, alignment, and materials, the Applicant will submit a revision to the First Iteration Environmental Management Plan **[APP-234]**. This revision will explain the design process in more detail, with reference to the application documents, and will include the specific principles applied to the design of structural elements. A summary of this process and how the design and visual appearance of the various permanent structures have been considered in the Landscape and Visual Impact Assessment (LVIA) is set out below. The Applicant has included design as an integral consideration from the outset and throughout the design process, in line with the criteria for "good design" set out in the NPSNN. Adverse effects on landscape and views were minimised through this process. Mitigation has been embedded in the Scheme design and this has informed the LVIA, the findings of which are set out in Chapter 7, Landscape and Visual Effects **[APP-076]** of the Environmental Statement. The design of the permanent structures within the Scheme was a collaborative and iterative process, informed by the LVIA, stakeholder engagement and the design principles set out in Annex L of the First Iteration Environmental Management Plan **[APP-234]**. These Scheme specific design principles were developed by the Applicant's team of landscape architects and presented to the engineering team in the early stages of the project in July 2018. This comprised a document which set out, reviewed and interpreted the design principles contained in the Highways England publication "The Road to Good Design" for the Scheme. This followed training provided by Highways England to the design team on "The Road to Good Design" on 27 June 2018. It was prepared prior to LD 117: Landscape Design being published in October 2019, and prior to publication of the National Infrastructure Commission's "Design Principles for National Infrastructure" in February 2020, but did draw on the extensive

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		environmental design guidance contained in the former Highway's Agency publication "The Good Roads Guide" (1996) and relevant criteria in the NPSNN. Other material prepared by the Applicant's landscape architects to inform the design of structures included a presentation on design, materials and finishes, issued in January 2019. This included analysis and guidance on setting, design objectives, materials, responding to local landscape and historic character, integration with public rights of way and addressing the objectives of published Green Infrastructure strategies. It also included examples of precedent and sketches of design options which have informed the siting, landscape integration, scale, height, massing, alignment of structural elements. The Applicant's landscape architects contributed to design team meetings and correspondence throughout the development of the preliminary design. In developing the preliminary design, a number of "design fix" milestones were identified for the purposes of undertaking the environmental impact assessment of the Scheme and to assist in the development of its engineering and environmental components. Work undertaken between design fixes included the identification of landscape and visual constraints and opportunities, including the siting and scale of earthworks and structures. Work was also undertaken to develop the design and appearance of structures following the statutory consultation and prior to submission of the Scheme application. Technical design information prepared by the Applicant's landscape architects was accordingly shared with the Applicant's highway designers. This process informed design considerations, optioneering and decision-making, for example: • Changes to the alignment to avoid areas of more sensitive landscape and historical character and function, including moving the route further north away from the registered Croxton Park. • Design principles for earthworks, informed by the landscape design principles. This resulted in changes to the earthworks design to achieve better integration with landform and vegetation and sustainable use of available resources. • Inputs to a preliminary structures finishes schedule. • Design information shared between structures and landscape on the form, scale, details and materials of the proposed Black Cat junction. • General principles within the River Great Ouse and inputs to the design of the River Great Ouse viaduct. • Design options for the footbridge east of St. Neots, which addressed the need to balance visual appearance of a key structure in the open landscape and minimise its visual impact. This resulted in the bridge being moved slightly north to make better use of existing topography and a single span, low profile, curving

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		structural design being adopted, as set out in the engineering sections (Part 3 - Structures General Arrangements) **[APP-019]**. • Design inputs to the Hen and Wintringham Brook crossings to minimise visual impact and maximise landscape permeability, including opportunities for Green Infrastructure, in line with the NPSNN. The LVIA has drawn from the application documents to assess the reasonable worst-case, accounting for embedded mitigation measures. This mitigation and a summary of the landscape strategy and design principles is summarised in section 7.8 of Chapter 7, Landscape and Visual Effects **[APP-076]** with further detail provided in the First Iteration Environmental Management Plan **[APP-234]**. Where relevant to each visual receptor, reference is made in the LVIA to permanent structures, including grade separated junctions, bridges, gantries and signs that would be visible. The detailed landscape baseline and assessment of landscape effects is provided in Appendix 7.3 **[APP-181]** of the Environmental Statement, and the detailed visual baseline and assessment of visual effects is provided in Appendix 7.4 **[APP-182]** of the Environmental Statement. Other visual material within the application used to inform the LVIA includes 18 verified and fully rendered photomontages of the Scheme. These comprise: • Viewpoint 06: Figure 15.06.03 and 15.06.04 **[APP-123]**. • Viewpoint 10: Figure 15.10.03 and 15.10.04 **[APP-125]**. • Viewpoint 12: Figure 15.12.03 and 15.12.04 **[APP-126]**. • Viewpoint 13: Figure 15.12.03 and 15.12.04 **[APP-126]**. • Viewpoint 17: Figure 15.17.03 and 15.07.04 **[APP-127]**. • Viewpoint 19: Figure 15.19.03 and 15.19.04 **[APP-128]**. • Viewpoint 22: Figure 15.22.03 and 15.22.04 **[APP-129]**. • Viewpoint 23: Figure 15.23.03 and 15.23.04 **[APP-130]**. • Viewpoint 32: Figure 15.32.03 and 15.32.04 **[APP-132]**. • Viewpoint 34: Figure 15.34.03 and 15.34.04 **[APP-133]**. • Viewpoint 35: Figure 15.35.03 and 15.35.04 **[APP-134]**.

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		• Viewpoint 38: Figure 15.38.03 and 15.38.04 **[APP-134]**. • Viewpoint 41: Figure 15.41.03 and 15.41.04 **[APP-135]**. • Viewpoint 44: Figure 15.44.03 and 15.44.04 **[APP-136]**. • Viewpoint 45: Figure 15.45.03 and 15.45.04 **[APP-136]**. • Viewpoint 46: Figure 15.46.03 and 15.46.04 **[APP-136]**. • Viewpoint 47: Figure 15.47.03 and 15.47.04 **[APP-137]**. • Viewpoint 52: Figure 15.52.03 and 15.52.04 **[APP-137]**. Landscape cross-sections **[APP-138]** within the Environmental Statement provide illustrations of key parts of the Scheme in elevation, including structures. These were prepared to help communicate how the Scheme would relate and integrate with its wider landscape context and have informed the LVIA.
Q1.13.3	**First Iteration EMP and Landscape and Ecology Management Plan**	
Q1.13.3.1	Applicant Local Authorities Natural England	**Question:** **Mitigation** a) LAs, are you satisfied with the level of detail regarding the proposed mitigation that would have been secured through the First Iteration EMP, including the Landscape and Ecology Management Plan **[APP-234]** and the dDCO **[APP-025]**? b) The ES states that one of the measures to mitigate the effects of construction activities includes sympathetic lighting to minimise disturbance to nearby receptors. Applicant, are you intending to provide any further information about the objectives for lighting measures, than is already provided in the First Iteration EMP **[APP-234, Section 1.4]**? LAs and NE to comment. c) LAs, would the Proposed Development be sufficiently screened, particularly relative to existing settlements, such as Roxton, St Neots, or Caxton-Toseland? d) CCC, elaborate on your concerns regarding HE's commitment to timing of planting, maintenance regime, and planting mixes **[RR-013]**.

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		Answer: b) The Applicant can confirm that it does not intend to submit further information regarding the objectives of the lighting measures to be adopted during Scheme construction, over and above the information already set out in the First Iteration Environmental Management Plan **[APP-234]**. Further information regarding construction lighting will be developed by the Applicant's Principal Contractor as part of the detailed design phase, which will be presented in greater detail within the Second Iteration Environmental Management Plan (EMP). The Second Iteration EMP is secured through Requirement 3 of the draft Development Consent Order (dDCO) **[APP-025]**. Requirement 3 states that the Second Iteration EMP must be submitted to, and approved in writing by, the Secretary of State before any of the authorised development can commence. The authorised development must be constructed in accordance with the Second Iteration EMP.
Q1.14	**Land use including open space and green infrastructure**	
Q1.14.1	**Geology and soils**	
Q1.14.1.1	Applicant Local Authorities Interested Parties	**Question:** **BMV agricultural land** The ES states that some 348 hectares of the BMV agricultural land will be permanently lost because of the Proposed Development, with some 512 hectares used temporarily, in association with the construction of the scheme **[APP-078, paragraph 9.9.25]**. a) Applicant, please explain in what specific ways consideration was given to BMV during design of the Proposed Development and provide the justification for the acknowledged harm **[APP-078, Table 9-14]**. For land that is to be returned to agricultural use following the construction of the scheme, what consideration has been given to its soil condition? b) Interested Parties, your RRs refer to land that has been subject to regenerative agricultural practices to improve it **[RR-039] [RR-061] [RR-083] [RR-113]**. Provide further details about the effects of these practices. LAs and Applicant to comment. c) Applicant, how has the route / junction option selection process considered BMV agricultural land, including in

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		terms of spatial functionality of remaining BMV agricultural land? LAs to comment.
		Answer: a) The Applicant has considered the BMV agricultural land in the design development of the Proposed Development by, in general, minimising permanent land acquisition and temporary possession and providing land plots more suitable for efficient farming operations. Examples include: – Following consultation with multiple landowners, realignment of the new dual carriageway between B1046 and Cambridge Road junction. This has shortened the route by approximately 117m and provided plots of land between the existing A428 and the new dual carriageway that are more suitable for efficient farming operations. In addition, where the new dual carriageway severs agricultural land, new accommodation bridges have been proposed to provide connectivity. – Siting the main construction compound on land marked for future development (planning consent granted) and not on adjacent BMV agricultural land. – Reduction in landscaping to reduce permanent impact on farming activities, as shown in the Supplementary Consultation - Consultation Booklet in the Consultation Report Appendix Q Part 1.1 **[APP-058]** (Map Reference - 42, 46, 47 and 52). – Following landowner consultation, landscape mitigation was reduced to connect field for improved farming operations, as shown in the Supplementary Consultation - Consultation Booklet in the Consultation Report Appendix Q Part 1.1 **[APP-058]** (Map Reference - 58). There was no opportunity to completely re-route the road alignment through lower quality agricultural land as the land classification in the region is all Best and Most Versatile (BMV) agricultural land as shown in Figure 9.3 – Agricultural Land Classification of the Environmental Statement **[APP-141]**. For the land that is to be returned to agricultural use, the soil condition will be managed and restored in accordance with Annex E - Soil handling and Management Plan of the First Iteration Environmental Management Plan **[APP-234]** and the subsequent iteration before construction. b) Section 9.4 of Chapter 9, Geology and Soils within the Environmental Statement **[APP-078]** for the Scheme explains that intrusive soils sampling surveys to inform the geology and soils assessment were planned for 2020. However due to the Covid-19 pandemic and associated local lockdown restrictions, these were unable to be undertaken. The Applicant has committed to undertake the surveys in 2021 (subject to the lifting of lockdowns)

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		and following the completion of the fieldwork and the analysis of findings, a report will be prepared by the Applicant and submitted to the Examination as further environmental information. The reinstatement of topsoils and subsoils on land temporarily acquired to construct the Scheme will be managed in accordance with the measures outlined in Annex E Soil Handling and Management Plan located within the First Iteration Environmental Management Plan **[APP-234]**. These measures aim to reduce disturbance and movement of soils to a minimum, however segregation of individual landowner soils to ensure condition is the same to that prior to the Scheme being commenced is not practicable on a Scheme of this nature and size. Notwithstanding this, the Principal Contractor will consult with the Interested Parties to identify possible interventions to retain soil condition. c) The route/junction option selection process identified that the area is predominately classed as Grade 2 (very good) with a small pocket of Grade 1 (excellent) at Black Cat roundabout. Each of the shortlisted route options as presented in the Option Assessment Report were qualitatively assessed against the Transport Analysis Guidance (WebTAG) environmental impacts. After Option Selection and Preferred Route Announcement (outcomes of the route optioneering phase of the project), there was no opportunity to re-route the road alignment through lower quality agricultural land without introducing other significant environmental impacts.
Q1.14.1.2	Applicant	**Question:** **Surveys** The Applicant expressed an intention to submit further information regarding soil resources, subject to Covid-19 restrictions easing to allow surveys to take place **[APP-078, paragraph 9.4.6]**. What is the status of these surveys and further information and when do you expect to submit it?
		Answer: The Applicant can confirm that the intention to undertake soil sampling and submit the survey findings into the Examination remains. The Applicant has had to delay undertaking these surveys to facilitate the requirements of landowners and the timing of agricultural cropping; however, it is envisaged that the information will be provided to the ExA in the form of a report on or before Deadline 6 of the Examination.
Q1.14.2	**Cumulative effects**	

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Q1.14.2.1	Applicant	**Question:** **Cumulative effects** What are the cumulative effects of the Proposed Development on Geology and Soils and explain how this is assessed in the ES **[APP-084] [APP-229]**?
		Answer: The Applicant has undertaken an assessment of the cumulative effects of the Scheme as part of Chapter 15, Assessment of Cumulative Effects **[APP-084]** and this examined: • Single project effects – which considered the potential for combined effects to occur (i.e. those derived from the different effects of the Scheme interacting and impacting environmental receptors or resources). • Different project effects – which considered the potential for incremental changes to occur (i.e. where the effects of the Scheme may add to the effects of other development plans and projects and affect environmental receptors or resources). The assessment of both types of effect took account of the embedded and essential mitigation measures identified within each topic assessment, the significance of which was determined using a combination of professional judgement and input from the competent experts responsible for undertaking the individual assessments. <u>Single project effects</u> This element of the cumulative effects assessment commenced with the identification of potential impact interactions associated with the Scheme upon individual environmental resources and receptors. These interactions were identified by reviewing the Scheme's impacts identified within the topic-specific assessments reported in the Environmental Statement **[APP-074 to APP-083]** to establish which environmental receptors and resources could potentially experience two or more individual effects. This review concluded a likelihood for: • In-combination construction-phase effects on human receptors (associated visual, noise, vibration and air quality impacts combining). • In-combination operational-phase effects on human receptors (associated with visual, noise and air quality impacts combining).

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		Although adverse environmental effects were recorded within Chapter 9, Geology and Soils assessment **[APP-078]**, the review of possible interactions identified no potential for the geological receptors, soil resources and contamination-sensitive receptors within that assessment to experience combined effects from construction and operation of the Scheme. Accordingly, combined effects in relation to the topic of Geology and Soils were not identified and therefore were not reported in Chapter 15, Assessment of Cumulative Effects **[APP-084]**. <u>Different project effects</u> This element of the cumulative effects assessment was undertaken using the four-stage approach set out within the Planning Inspectorate's *Advice Note Seventeen*, and commenced with the identification of other existing development and/or approved development (Stage 1) within a long-list. The identification of other developments was informed by establishing Zones of Influence for each environmental topic assessed and reported within the Environmental Statement **[APP-074 to APP-083]**. As part of Stage 1, the Applicant identified that the Zone of Influence for Geology and Soils extended to 500m from the Scheme (both construction and operation), and that this was significantly less than other topic Zones of Influence, which extended much farther outward beyond the Scheme. A process of development shortlisting was undertaken during Stage 2, which identified that five developments from the long-list should be carried forward into Stage 3. Published information relating to the five shortlisted developments was gathered and subsequently reviewed as part of the Stage 3 activities to understand the likely environmental effects, to identify how and where these effects could potentially interact with the effects of the Scheme and thereby lead to incremental changes on environmental receptors and resources. The assessment of potential interactions between the Scheme and the shortlisted developments undertaken as part of Stage 4 was reported in the form of an Assessment Matrix **[APP-229]**, which identified that cumulative effects would likely only occur: • On environmental receptors and resources that were geographically common (overlapping) to both the Scheme and the other developments. • Where a temporal overlap was likely between construction and/or operational of the Scheme and the shortlisted developments.

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		Stages 3 and 4 concluded that the geographical and temporal interactions between the Scheme and the shortlisted developments would only occur on environmental receptors and resources within the topics of Landscape and Visual Effects, Noise and Vibration, and Biodiversity. In relation to the topic of Geology and Soils, although Stages 3 and 4 identified that several of the shortlisted developments fall within the 500m Zone of Influence, the review of published environmental assessments pertaining to these developments recorded either: • Insufficient information being available on the assessment of effects on geological and contamination-sensitive receptors. • No effects (or negligible effects) reported post-mitigation on geological and contamination-sensitive receptors. In relation to soils resources, although some of the published environmental assessments of the shortlisted developments recorded adverse effects associated with the loss of agricultural soils, the review of spatial overlaps between those shortlisted developments and the Scheme identified very limited potential for any interactions to occur on geographically common soil resources. The review concluded that the adverse effects of the Scheme associated with the loss of, or disturbance to, agricultural soils would be confined to those resources located within Order Limits. Similarly, the effects on soils from the shortlisted developments would be confined to their respective project boundaries. Accordingly, as no incremental effects in relation to the specific topic of Geology and Soils were identified, no cumulative effects were reported in Chapter 15, Assessment of Cumulative Effects **[APP-084]**.
Q1.15	**Need for Development and Consideration of Alternatives**	
Q1.15.1	**Need for Development**	
Q1.15.1.1	Applicant	**Question:** **Parameters and description of the scheme** a) What effect would widespread and long-term changes to people's working patterns, such as working from home for some or part of the time as experienced during the Covid-19 restrictions, have on the assessment of need for the scheme? b) What effect would the changes in ways of working, as a result of the ongoing rollout of high speed broadband

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		infrastructure as referenced in the Government's National Infrastructure Strategy, have on the assessment of need for the scheme? c) With reference to Scheme Objective a Connectivity **[APP-071, Section 2.2]**, what is the current and projected road journey time between Cambridge and Milton Keynes, with and without the scheme? What is the difference as a proportion of the overall journey time? d) With reference to Scheme Objective c. Economic Growth **[APP-071, Section 2.2]**, describe spatially and locationally the people and jobs that would be served by the Proposed Development. e) List other development projects that would be enabled by the Proposed Development. LAs may also identify development projects. What would be the planned increase in dwellings/ population served by the Proposed Development upon completion? f) Explain what you mean by "Wider Economic Benefits" and "Journey Time Reliability" identified as benefits in the ES **[APP-240, Table 4-4]**. How are these benefits different to the previously identified "*Commuting User benefits*", "*Other User benefits"* and "*Business User benefits*" in the same table?
		Answer: a) As travel restrictions are lifted, it is expected that there could be impacts on travel behaviour in the medium and longer-term. At present there is no consensus on what these impacts will be or the scale of these changes. However, it is possible that the COVID-19 pandemic and the associated restrictions have accelerated a number of trends in travel behaviour. The impacts of increased homeworking on travel are nuanced and complex. On one side, an increase in homeworking and remote meetings could reduce the number of commuting and business trips made by employees during the working day. However, the removal of commuting time provides additional time in which new trips could be made (such as to gyms, restaurants/bars, or to visit friends/family). Travel by public transport reduced by a larger amount than highway travel. This is partly due to the social distancing measures enforced on public transport and a perceived concern about infection on public transport, especially on crowded bus and rail services. In addition, trips previously made by rail commuters are no longer made due to commuters working from home.

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		It is possible that some trips which used public transport prior to the COVID-19 pandemic are now being made by car or active modes (walking and cycling), in part offsetting the reductions in highway traffic due to increased working from home, but it is unclear whether these trends will persist into the long-term. A review of available evidence has been undertaken including a review of the Department for Transport's (DfT) national traffic information by mode and destination type, and the Office of National Statistics trends in working from home by sector and by region. This analysis is reported in Technical Note 71 (Assessing the Potential Impacts of COVID 19 – the implications for traffic forecasts for the Scheme (TR010044/EXAM/9.9)). Based on the available evidence, the study found that travel on the highway network reduced significantly due to the lockdown measures; however, the reductions have been less than those for rail and bus, and the recovery in highway travel has been stronger than that for public transport. This evidence also showed that nationally, when considering data for May 2021 (the latest data available), highway travel has returned to broadly pre-COVID levels, whereas travel by public transport remains suppressed at round 30% to 50% below pre-COVID levels. Data from sites at four locations on the Strategic Road Network (SRN), in the vicinity of the proposed Scheme (two locations on the A428 and one on the A1 and the A421), were also assessed between 1st January 2020 to June 2021. This showed a similar pattern to the results from the Department for Transport's national monitoring survey. This analysis is also reported in Technical Note 71 (Assessing the Potential Impacts of COVID 19 – the implications for traffic forecasts for the Scheme (TR010044/EXAM/9.9)). To summarise, the evidence available from the national and local traffic monitoring demonstrates that the demand for road-based travel is very resilient. Although we cannot be certain about the impacts of the pandemic on the demand for travel over the longer term, the latest data provides reliable evidence in support of the need for the Scheme. **DfT Travel Statistics by Mode (excludes London buses)**

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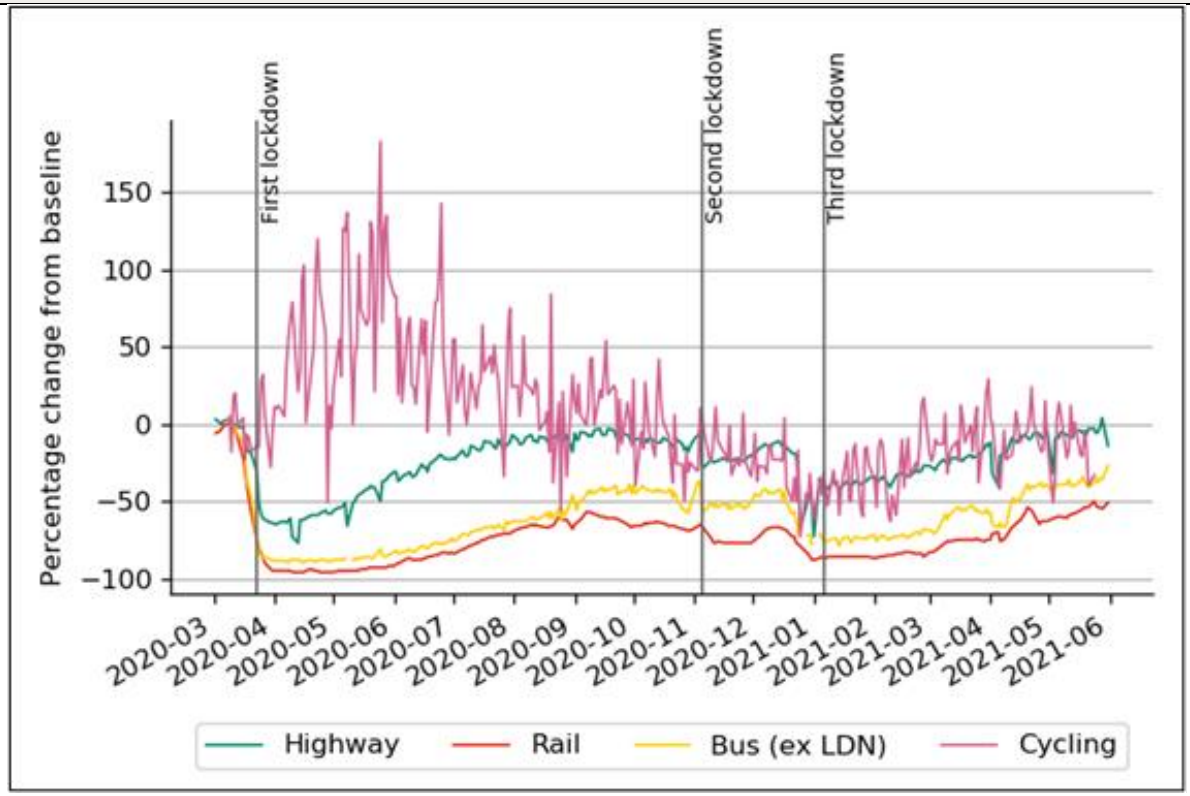

Source: https://www.gov.uk/government/statistics/transport-use-during-the-coronavirus-covid-19-pandemic

b) Rollout of the high speed broadband will facilitate home/remote working and more flexible work arrangements as well as virtual meetings/conferences thereby reducing the need for both travel to work and for business travel. It will also facilitate on-line shopping and home deliveries.

This is likely to further accelerate the trend towards on-line working that resulted from the COVID-19 restrictions during 2020 and 2021.

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As noted in the response to part a) above, the impacts of increased homeworking on travel are complex. This could reduce the number of commuting and business trips made by employees during the working day although the removal of commuting time provides additional time in which new trips could be made.

The DfT's National Trip End forecasts, upon which the Scheme forecasts and assessment of the need for the Scheme have been based, will be updated and will take account of the latest DfT research on the impacts of Covid-19 on future travel behaviour, including the recent trends in home working. However, these are not expected to be issued until late 2021 or early 2022.

c) Based on the 2015 Base Year (BY) model, the current journey time between Milton Keynes and Cambridge is approximately 1 hour in the AM and PM peak, and the inter-peak (IP) journey time is slightly shorter at approximately 55 minutes. It forecasts that the journey time without the Scheme will increase by approximately 10 minutes overall in 2040, which accounts for a 18% increase from the BY. With the Scheme in place, the journey time will generally decrease by approximately 10 minutes (15% reduction) from the without Scheme scenario. The detailed journey time comparison is provided in the table below.

			2015 BY	2040					
Route Description	Time Period	Direction	Modelled (mm:ss)	DM Time (mm:ss)	Change from BY (mm:ss)	Change from BY (%)	DS Time (mm:ss)	Change from DM (mm:ss)	Change from DM (%)
Milton Keynes to Cambridge via A421/A428	AM	EB	01:01:31	01:11:50	10:18	17%	01:00:36	-11:14	-16%
		WB	01:00:19	01:08:13	07:54	13%	00:57:53	-10:20	-15%
	IP	EB	00:56:07	01:06:35	10:29	19%	00:56:10	-10:25	-16%
		WB	00:54:42	01:04:23	09:41	18%	00:54:40	-09:43	-15%
	PM	EB	01:06:16	01:17:16	11:00	17%	01:06:38	-10:38	-14%

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		WB	00:59:50	01:10:22	10:32	18%	00:59:20	-11:02	-16%

d) Currently, the existing A428 is the only section of single carriageway on the SRN between the M1 motorway near Milton Keynes and the M11 at Cambridge and delays and queuing are recognised to be an issue, particularly at the existing Black Cat roundabout, by local residents and other road users. It provides east-west connectivity in the area between the urban centres of Cambridge, Cambourne, St Neots, Bedford and beyond to other economic centres such as Milton Keynes and Northampton.

It is also used by long distance traffic, including vehicles travelling between important regional, national and international hubs such as Felixstowe and Harwich ports. Improving the SRN capacity along the A428 corridor is required to support both local and regional economic growth which is constrained by poor east/west connectivity.In addition to existing demand, significant development is planned along the Scheme corridor and beyond, with each of the host authorities identifying significant growth in their current and emerging Local Plan periods and having an ambition for further growth beyond then. The Scheme will have a marked impact on the economy, connectivity and accessibility, and is needed to unlock both planned and long-term future growth.

Local Development Plans

- The Bedford Borough Local Plan, adopted on 15 January 2020, sets out that a minimum of 2,000 new homes and 6,900 net new jobs will be delivered in the Borough by 2030.
- The Draft Central Bedfordshire Local Plan seeks to make provision for 24,000 new jobs and 39,350 new homes over the 2015-2035 plan period.
- The Huntingdonshire Local Plan was adopted in May 2019 and covers the period to 2036. It makes provision for 14,400 additional jobs and 20,100 new homes in the district between 2011 and 2036. This includes 3,820 homes and 22 hectares of employment at St Neots East, an allocation at Wintringham, adjacent to the existing A428.
- The South Cambridgeshire Local Plan was adopted on 27 September 2018. It sets out a target of 22,000 new jobs and 19,000 new homes in the District by 2031. This includes 3,500 dwellings at Bourn Airfield and 1,200 dwellings at Cambourne West, both of which are just beyond the eastern extent of the Scheme at Caxton Gibbet.
- The Cambridgeshire Local Transport Plan 2011-2031, Long Term Strategy, July 2015 (Cambridgeshire LTP) (Ref 4-10) sets out the County's requirements for major infrastructure that is needed in order to address

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existing issues and capacity constraints on Cambridgeshire's transport network. It also sets out the further infrastructure that is required to cater for the transport demand associated with planned growth. This includes facilitating delivery of development at the Cambourne West and Bourn Airfield allocations.

- Beyond the host authorities, the Cambridge Local Plan, 2018 (Ref 4-11) and the emerging North Hertfordshire District Local Plan, 2016 (Ref 4-12) each plan for more than 14,000 new dwellings over the plan periods and 22,100 new jobs and more than 30 hectares of employment land respectively.

It is considered that the Scheme would benefit a number of proposed and committed developments close to the Scheme. The table shown in part E) outlines some of the significant and committed developments within close proximity to the A428 Scheme. The Scheme would support local and regional economic growth by improving east-west connectivity and enhanced north-south traffic flow.

e) It is considered that the Scheme would benefit a number of proposed and committed developments close to the Scheme. However, it is understood that there are not currently any developments that are both 'committed' (planning permission pending or approved) and 'dependent' on the Scheme (whereby planning conditions dictate that the A428 Improvements are required for the development to be implemented).

The following table outlines some of the significant, committed developments close to the Scheme and the proposed number of dwellings and jobs they could deliver.

District	Site name	Dwellings	Estimated Jobs	Planning Application Reference	Planning Status	Certainty Classification
Huntingdonshire	Wintringham Park	2,800	2,420	Outline 17/02308/OUT	Approved subject to S106 March 2018	Near Certain
Huntingdonshire	Loves Farm 2	1,020	1,450	Reserved Matters 01/01550/OUT	Approved	Near Certain
South Cambridgeshire	Bourn Airfield New Village	3,500	780	S/3440/18/OL	Awaiting Decision	More than Likely

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South Cambridgeshire	Cambourne West	2,350	1,320	S/2903/14/OL	Approved	Near Certain
Totals		**10,088**	**5,970**			

From a review of the planning conditions of these significant developments it is considered that the developments will still come forward regardless of whether the Scheme is built; however, the A428 upgrade is mentioned and could influence which of the associated mitigation proposals are required. The Cambourne West development identified minor improvements at the Caxton Gibbet roundabout, but these would not be required if the Scheme is implemented.

It should be noted that there are also some emerging local plan strategic sites that mention the upgrade of the A428 and the development. In Bedford's emerging 2040 Local Plan, Option 2B and 2C outline that Wyboston Lake (2,500 dwellings) and Little Barford (3,085 Dwellings) are within close proximity to the A428 near Black Cat roundabout. As aforementioned, these sites are part of the first draft of an emerging local plan that has not reached its first submission stage and therefore could be considered conceptual/aspirational at present. Figure 1 below displays the two proposed sites in relation to the A428.

Figure 1: Bedford 2040 emerging plan – Option 2b

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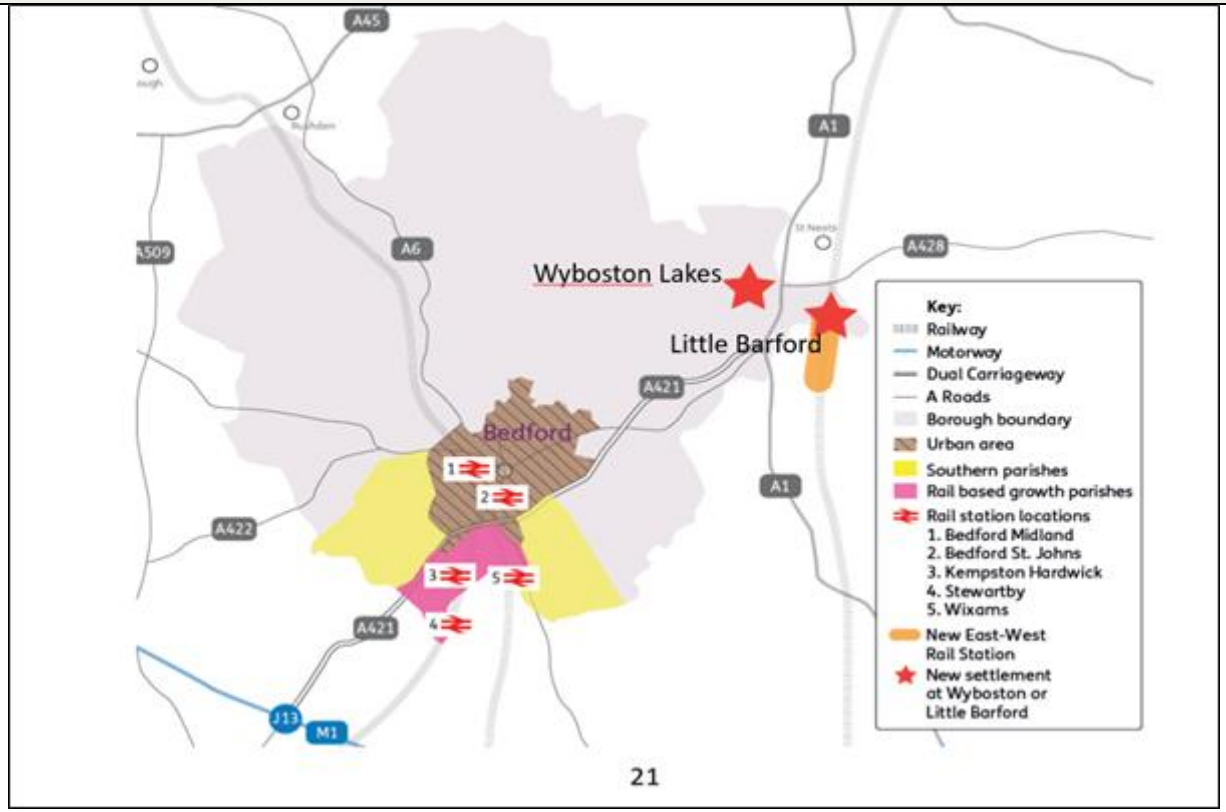

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In addition, Tempsford is another growth area identified in Central Bedfordshire close to the Scheme. The exact allocation of dwellings proposed in the Tempsford area is unclear. Central Bedfordshire Council's (CBC) Draft Local Plan identifies an allocation of 7,000 dwellings but AECOM have been informed from Bedford BC that this could be as many as 25,000 dwellings. The Draft Local Plan stated that "Full scale development here [Tempsford] is dependent on improvements to existing transport infrastructure, such as the A1 and A428 roads."[1] The Local Plan is currently being examined and therefore not yet adopted. It is unclear if the Tempsford growth area will form part of the adopted Local Plan at this stage and if the local plan policies require the A428 improvement to be implemented before the Tempsford growth area is considered.

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		[1] https://www.centralbedfordshire.gov.uk/info/45/planning_policy/469/draft_local_plan/3 f) A key distinction in the valuation of travel time savings in the Transport Users Benefit Appraisal (TUBA) program is by journey purpose, and specifically between values for trips made on employers' business (or working time), and consumer (or non-working time) values including commuting and all other leisure purposes. **Business User benefits** are the benefits accrued by business travellers, including car (and van) occupants travelling on employers' business. This group also includes HGV drivers. Consumer users are non-business travellers, in cars and vans. This group includes: • Commuters, who are also classified as consumers as they are travelling in their own time, not that of their employers. The benefits for the commuter are **Commuting User benefits**. • People travelling for "other" purposes (i.e. not business or commuting), who may receive **Other User benefits** from the transport scheme. The **Business User benefits**, **Commuting User benefits** and **Other User benefits** are included in TUBA. **Wider Economic Benefits** refer to economic impacts which are additional to TUBA, e.g. travel time, vehicle operating costs etc. The benefits (or disbenefits) will arise as the impacts of transport improvements are transmitted into the wider economy. These include the impacts in secondary markets (non-transport markets), such as the productivity gains resulting from improved business connectivity and benefits arising from structural changes as businesses relocate. **Journey Time Reliability** refers to variation in journey times that individuals are unable to predict. Such variation could come from recurring congestion at the same period each day (day-to-day variability, or DTDV) or from non-recurring events, such as incidents. In accordance with Transport Analysis Guidance (TAG), the measure of journey time variability employed was the standard deviation of journey times. The monetary benefits of improved reliability were calculated by applying TAG values of time (as adjusted by the reliability ratio) to the change in standard deviation of the journey times.
Q1.15.2	**Business case**	
Q1.15.2.1	Applicant	**Question:** **Construction and operation cost** a) Please explain what the Indirect Tax Revenues of £83.8m in of the ES **[APP-240, Table 4-4]** refers to and how

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		the scheme delivers them. b) Notwithstanding the different base year, explain how the stated (construction) cost of the scheme in the ES at paragraph 4.7.8 (£812.5 million) corresponds with the figures in Table 4-4 **[APP-240]**. c) Notwithstanding the different base year, explain how the stated annualised operation and maintenance costs of £6.3 million per annum at paragraph 4.7.9 of the ES **[APP-240]** corresponds with the figures in Table 4-4.
		Answer: a) Tax revenues are the revenues that government receives from indirect taxation on goods and services, including VAT, excises and duties. The £83.8m that has been calculated in the economic assessment results from changes in vehicle operating costs as a result of the Scheme, including fuel consumption and non-fuel costs such as tyres, maintenance and depreciation. The Scheme results in additional vehicle kilometres travelled and changes to vehicle speeds. This results in overall additional vehicle costs that generate increases in tax revenues over 60 years of £83.8m in 2010 prices discounted to 2010. b) The £812.5m construction cost (based on 2019 quarter 1 construction prices) is an estimated outturn cost over the duration of the Scheme development and construction from 2019 onwards. For Scheme assessment purposes and ensuring like-for-like assessment against other new road schemes, a standard 2010 price base is used with costs also discounted to 2010. To convert the £812.5m outturn cost to 2010 prices any historic costs and non-recoverable VAT are removed following which the residual outturn costs are deflated, per year, by the associated GDP deflator factor. These costs in 2010 prices are then discounted to 2010 using a discount rate of 3.5% per annum. This results in a present value cost, for construction, of £435.6m in 2010 prices, c) The £6.3m operational cost (based on 2019 quarter 1 construction prices) is an estimated average costs per year over the 60 year duration of the Scheme. For the economic appraisal of the Scheme to ensure a like-for-like assessment against other new road schemes, a standard 2010 price base is used with costs also discounted to 2010. To convert the £6.3m cost per annum to 2010 prices, the costs are deflated, per year, by the associated Gross Domestic Product (GDP) deflator factor. These costs in 2010 prices are then discounted to 2010 using a discount rate of 3.5% and 3% per annum. This results in a present value net cost, for operation and maintenance of £27.6m in 2010 prices.

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Q1.15.3	**Cost benefit analysis**	
Q1.15.3.1	Applicant	**Question:** **Effect on air quality** Explain how the overall negative benefit of the scheme in terms of air quality is consistent with the scheme objectives. (See related questions under Air Quality)
		Answer: Section 1.2 of the Case for the Scheme **[APP-240]** includes the following Scheme Objective that references air quality: • **Environmental improvements**: Maintain existing levels of biodiversity and have a beneficial impact on air quality and noise levels in the surrounding area. The Applicant assumes that the ExA is referring to the economic assessment of the Scheme when referring to the "*negative benefit of the scheme in terms of air quality*", the outcomes of which are summarised in Section 4.7 of the Case for the Scheme **[APP-240]** and are presented in full in the Combined Modelling and Appraisal Report **[APP-250]** and within Appendix E Appraisal Summary Table and Supporting Worksheets Report **[APP-255]**. The economic assessment of air quality effects differs from the environmental assessment of air quality effects in that it involves appraising the associated benefits and disbenefits using the Department for Transport's Transport Analysis Guidance and ascribing a monetised value to them. There are two aspects to the valuation for air quality: the local appraisal, which assesses the effect on individual properties; and the regional appraisal, which considers the total emitted volumes of pollutants. The local appraisal demonstrates an overall improvement in assessment score for both nitrogen dioxide (NO_2) and particulate matter ($PM_{2.5}$) for both the opening year and the design year, as presented in Section 3.5 of Appendix E Appraisal Summary Table and Supporting Worksheets Report [**APP-255]**. In contrast, there is an increase in overall emissions of pollutants across the road network due to the increase in vehicle kilometres travelled with the Scheme in place, compared to without the Scheme. The monetised value derived from the economic assessment was -£0.8 million.

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		On the basis of the negative monetised value recorded, the Applicant can confirm that the air quality component of the "Environmental improvements" Scheme Objective would not be fully met by the Scheme. Notwithstanding the fact that the economic assessment concluded that the Scheme would result in an overall increase in regional emissions of NO_2 and $PM_{2.5}$, the assessment found that the Scheme would result in local air quality benefit in some areas – something which the Scheme Objective seeks to deliver by way of its reference to the 'surrounding area'. The Applicant also notes that within Chapter 5, Air Quality assessment **[APP-074]**, the maximum adverse effect predicted at any receptors is "small" (less than 5% of the air quality objective value), whereas there are medium (5-10%) and large (>10%) improvements at receptors located close to the alignment of the existing A428 along with small improvements within a number of villages in the surrounding area. Furthermore, the operational Chapter 5, Air Quality assessment **[APP-074]** concluded that the Scheme would not result in significant effects on human health or designated habitats, nor would it affect the UK's reported ability to comply with the Air Quality Directive in the shortest timescale possible.
Q1.15.3.2	Applicant	**Question:** **Effect on BMV agricultural land** How has the loss of 348 hectares of BMV agricultural land been considered in making the case for the Proposed Development? What would be the local economic benefits of the scheme given this loss? (See related questions under Land use including open space and green infrastructure)
		Answer: The National Policy Statement for National Networks (NPS NN) states, in paragraph 5.168 that Applicants should take into account the economic and other benefits of the best and most versatile agricultural land (BMV) (defined as land in Grade 1, 2 and 3a of the Agricultural Land Classification). It goes on to say that where significant development of agricultural land is demonstrated to be necessary, applicants should seek to use areas of poorer quality land in preference to that of higher quality. There is no absolute embargo upon the loss of BMV Land in relation to national infrastructure transport projects. Due to the linear nature of the project, by necessity, BMV land could not be avoided. However,

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		during the development of the Scheme, impacts upon BMV land were minimised, wherever possible - by minimising permanent land acquisition and temporary possession and providing land plots more suitable for efficient farming operations. Examples include: - Following consultation with multiple land owners, realignment of the new dual carriageway between B1046 and Cambridge Road junction. This has shortened the route by approximately 117m and provided plots of land between the existing A428 and the new dual carriageway that are more suitable for efficient farming operations. - Siting the main construction compound on land marked for future development (planning consent granted) and not on adjacent BMV agricultural land. - Reduction in landscaping to reduce permanent impact on farming activities, as shown in the Supplementary Consultation - Consultation Booklet in the Consultation Report Appendix Q Part 1.1 [APP-058] (Map Reference - 42, 46, 47 and 52). - Following landowner consultation, landscape mitigation was reduced to connect field for improved farming operations, as shown in the Supplementary Consultation - Consultation Booklet in the Consultation Report Appendix Q Part 1.1 [APP-058] (Map Reference - 58). There was no opportunity to completely re-route the road alignment through lower quality agricultural land as the land classification in the region is all Best and Most Versatile (BMV) agricultural land as shown in Figure 9.3 – Agricultural Land Classification of the Environmental Statement **[APP-141]**. The Case for the Scheme **[APP-240]**, in Appendix A provides, in tabular form, details explaining how the application complies with the NPS NN. Row 5.168 explains that Chapter 9, Geology and Soils of the Environmental Statement **[APP-078]** sets out the proportion of agricultural land and best and most versatile agricultural land within the Order limits. It explains that the impact of the loss of BMV land is taken into account within the Economic Assessment Report that was submitted as Appendix D of the Combined Modelling and Appraisal (ComMA) report **[APP-254]**. The ComMA **[APP-254]** (in sections 4.3 to 4.5 and 4.8) explains that local economic benefits that would be derived from the Scheme include better journey time reliability; improved environmental benefits for those communities adjacent to (or near) the existing A428, including noise decreases that are predicted at a small number of receptors during the night (which out-weigh noise increases which are predicted at receptors near to the proposed alignment around existing roads); as well as benefits through reduced numbers of accidents.

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		Paragraph 4.8.1 of the Case for the Scheme **[APP-240]** explains further, in the summary of the need and benefit of the Scheme, that if the Scheme was not delivered, network safety would deteriorate further, resulting in increased accident rates in future years; congestion would worsen, with the existing route being already identified as close to capacity and exceeding capacity at some locations during peak periods. In terms of economic growth – significant development is planned along the Scheme corridor and beyond, with each of the host authorities identifying significant growth in their current and emerging Local Plans and having an ambition for growth beyond then. The Scheme would have a marked impact upon the economy, connectivity and accessibility, and is needed to unlock both planned and long-term future growth. The Case for the Scheme **[APP-240]**, paragraph 4.8.2 explains that the Scheme would deliver benefits to the local economy based upon creating additional road capacity; improving safety; alleviating congestion; and reducing journey times which would reduce a barrier to planned economic growth as well as improving the connectivity of communities in the area. ~~REVIEW STONEHENGE DECISION/INSPECTORS REPORT~~ ~~REVIEW CASE FOR THE SCHEME~~ ~~REVIEW CHAPTER ON SOILS AND GEOLOGY~~ ~~REVIEW SIMILAR Qs~~
Q1.15.3.3	Applicant	**Question:** **Climate change** Have other costs of future climate change, such as extreme weather conditions, flooding, heatwaves, droughts, food and water supplies and including costs to the Health Service, been considered over the expected lifetime of the scheme, in addition to the Greenhouse Gas cost **[APP-240, Table 4-4]**?
		Answer: The costs associated with extreme events due to climate change have not been included as this is not one of the appraisal areas set out in the Department for Transport (DfT) Transport Analysis Guidance (TAG), Unit A3 Environmental Impact Appraisal (EIA).

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		Paragraph 1.4 of TAG Unit A3 sets out the categories of environmental impact. These include the impacts that arise as a result of changes in traffic using the Scheme, which is the main contributor to changes in greenhouse gas emissions. A scoping exercise was undertaken in mid-2019 to identify the matters to be covered by the climate and greenhouse gas assessment and agree the approach with relevant statutory bodies. The Planning Inspectorate's Scoping Opinion **[APP-231]** identified a number of additional overarching environmental impact assessment and topic-specific matters. These were subsequently included in the overall scope of the climate assessment reported in Chapter 14, Climate **[APP-083]** of the Environmental Statement. The scope of the climate assessment was also broadened to include new relevant technical standards and reporting guidance, the outcomes from other consultation and engagement, changes to the Scheme's Order Limits, and to account for updated data and information. Aa summary of these scope modificationsis presented in Appendix 4.3 of the Environmental Statement **[APP-157]**. The influence of climate change to food supplies and costs to the Health Service was not requested by the Planning Inspectorate or consultees at the scoping stage as a matter requiring consideration in the climate assessment. The UK Climate Projections 2018 (UKCP18) high emissions scenario has been used against the 2080 projections at the 50% probability level to assess the impacts of climate change to the scheme in the climate change resilience assessment, and examine the influence of climate change to scheme-related impacts to other sensitive receptors in the in-combination climate change impact (ICCI) assessment presented in Chapter 14, Climate **[APP-083]**. The climate change resilience assessment examined the likelihood, consequence and significance of severe weather events including heavy rainfall events, low rainfall, increasing temperatures and heatwaves during the expected lifetime of the Scheme. After consideration of the mitigation measures embedded into the Scheme design, and the assumed management practices, the residual risk was determined to be not significant. During engagement with other socio-environmental technical leads including specialists undertaking landscape and population and human health assessments for the Scheme, potential ICCIs were identified to landscape and human health during the expected lifetime of the Scheme (see Chapter 14, Climate, table 14-13 **[APP-83]**); however, the residual risk was also determined to not be significant and therefore additional mitigation measures were not required.
Q1.15.4	**Alternative modal solutions**	
Q1.15.4.1		**Question:**

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	Applicant East West Rail Company	**East West Rail** Additional Submission from EWR Company [AS-004], various RRs, including from BBC [RR-008a] and the TA **[APP-242, Section 2.5]** refer to the proposed EWR scheme that would provide a new railway linking Bedford to Cambridge. Applicant, explain your engagement with EWR Company in the development of the Proposed Development? EWR Company to comment.
		Answer: Highways England and EWR have met frequently on a monthly basis to provide an opportunity to discuss at a high level the Development Consent Order (DCO) scheme, potential programme implications and design interfaces. These regular meetings will continue and if necessary, more focused meetings will be held as required. Note that there have been numerous requests from EWR to share information which Highways England, where possible,has supplied, notably around the design, ecology, utility information, and traffic information. It is noted that the Applicant has provided a cordon of the A428 strategic traffic model to EWR which will support their model development. In terms of the information supplied by EWR this has to date been limited given the current status of the EWR scheme. The Applicant has made requests for the demand forecasts prepared by EWR although it is understood that these are currently in preparation. Hence the Applicant's difficulty to provide meaningful analysis of impacts, indeed without sufficient information potentially damaging conclusions could be drawn. The Applicant will continue to discuss with EWR as more detail becomes available.
Q1.15.4.2	Applicant	**Question:** **Assessment of need** NPS NN (paragraph 4.27) states that all projects should consider viable modal alternatives and may consider other options. It also makes numerous references to modal shifts from road to rail (NPS NN paragraphs 2.37, 2.40). Have you had regard to the proposed EWR scheme on the assessment of need for the Proposed Development? If so, please explain the findings of your assessment. If not, why not?
		Answer: **At the Issue Specific Hearing on 18 August the Applicant confirmed that, notwithstanding the overall absence of information regarding the detailed effects of East West Rail (EWR), it has been possible to consider**

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		information provided in 2018 by EWR on the potential for modal shift from the A428 Scheme arising from the construction of an EWR Scheme. Further details of this assessment are included under point 3 below. **The proposed East West Rail (EWR) was considered at various stages of the assessment of the proposed A428 Scheme.1. Initial assessment at Option Identification Stage** An initial assessment of alternative modes was undertaken to inform the option identification process as part of Highways England's Project Control Framework (PCF) Stage 0. This involved assessing a wide range of highways, public transport and non-motorised user options. The 5 public transport options comprised • East West Rail Link. • Park and Ride at St Neots. • Tram services. • Bus service improvements. • Guided busway extension The options were assessed using an 'Initial Sifting Tool' that allowed for the scoring of each option against identified problems and objectives prior to taking forward to the DfT's Early Appraisal and Sifting Tool (EAST). Based upon the results of the initial assessment none of the public transport options assessed at PCF Stage 0 were taken forward for assessment using EAST. The results of this assessment were reported in the Option Assessment Report, Ref B2074900/A6S/A428/XX/RP/PM/00025, dated March 2016. **2. Assessment at Option Selection Stage** A further assessment of alternative modes was undertaken for PCF Stage 2 in 2018 as part of the option selection process. This comprised a review and re-assessment of the options carried out at PCF Stage 0, following an extensive traffic data collection programme and updated traffic modelling and forecasting. This assessment followed the guidelines set out in Highways England's Traffic Appraisal Modelling and Economics (TAME) Advice Note 2 v1.0 published in July 2015 that were intended to address the requirements of the National

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		Networks – National Policy Statement (NN NPS). This requires that scheme promoters must demonstrate consideration and assessment of alternative options, including examining options using different modes of transport. The five public transport options, including an East West Rail Link, that had previously been assessed as part of the PCF Stage 0 were again assessed using an 'Initial Sifting Tool'. This allowed for the scoring of each option against identified problems and objectives prior to being taken forward for assessment using EAST. The Stage 2 review concluded that an alternative mode solution would not contribute to solving the problems experienced on the A428 between Black Cat and Caxton Gibbet and therefore would not meet the scheme objectives. While a larger scale rail alternative would alleviate some of the problems through encouraging modal shift, the likely modal shift would not be sufficient to reduce congestion and delay. The assessment carried out at PCF Stage 0 was therefore considered to remain valid. Details of this assessment are presented in the 'Assessment of Alternative Modes' (HE551495-JAC-XXX-XX-RP-TR0013) dated 6 August 2018 **3. Further Review and Assessment** As part of the Stage 2+ assessment an update of the traffic model developed under Stage 2 (to form the Stage 2+ model) was undertaken to improve analytical assurance. A further review of the assessment of options identified at PCF Stage 2 was therefore carried out. The purpose of this re-assessment was to reflect the updated Stage 2+ modelling and to capture any relevant updates following the issue of the Assessment of Alternative Modes report in August 2018. This assessment was prepared in accordance with the published HE guidance for PCF Stage 2, using outputs from the Stage 2+ model. The PCF Stage 2 assessment of alternative modes consists of a simple two-level assessment. Two questions must be addressed as follows: *Level 1: "Could an alternative modal intervention solve the identified problem?"* In the event that the answer to this question is 'yes', a second level of test must be considered and assessed: *Level 2: "Knowing the benefits of the preferred option, what impact would a modal alternative require in order to relieve the problem to the same degree and is that viable?"* In order to address the Level 1 question, the following alternative modal interventions were considered:

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		• Improvements to the provision for walkers, cyclists and horse riders. • Road based public transport to include increased bus service frequencies. • Off-road public transport, including the expansion of the Guided Busway between Cambridge and St Ives into a fully-fledged Cambridge Autonomous Metro (CAM, sometimes labelled Cambridge Area Metro) extending to Cambourne, known as the Cambourne to Cambridge (C2C) link. • Enhanced frequencies and capacity on existing rail, (East Coast Main Line). • Proposed new East West Rail Route. Full details of the Level 1 assessment are reported in Chapter 2 of the Stage 2+ Alternative Mode Assessment Report, (HE551495-ACM-GEN-GEN_SW_Z_ZZ-RP-TR-0004 P06 S4, dated August 2020. It was concluded that only the EWR proposals could potentially provide a solution to the identified problems and therefore should be considered further in the Level 2 assessment. The Level 2 assessment of the East West Rail scheme utilised information provided by East West Rail Limited that included forecasts of trips diverting from highway to EWR services. Based on this, it has been determined that there could be a transfer of between 900 and 1,500 car trips per day from the A428 corridor onto EWR. This daily transfer is small compared to the number of daily vehicles forecast to use the A428 Scheme in 2040 (29,000 between Black Cat and Cambridge Road; and 46,000 between Cambridge Road and Caxton Gibbet). While EWR would reduce the future flows on the road improvement scheme, it would not remove the need for it. It was therefore concluded that EWR would only result in a very modest transfer of trips from road (car) to rail, and as a result would provide only a very partial relief to the A428's problems. Highways England recognises that both the A428 Black Cat to Caxton Gibbet DCO Application and East West Rail Project seek to improve transport reliability from east to west, make journeys quicker and easier. It therefore agrees with the National Infrastructure Commission's (NIC) recommendation for a multi-modal corridor between Oxford and Cambridge combining EWR and the proposed new A428 dual carriageway between Black Cat and Caxton Gibbet. Overall, both schemes are complementary in terms of meeting the objectives of the NIC and Government in creating easier and more reliable east to west travel. As explained at the Issue Specific Hearing 1 on 18 August 2021, the schemes are complementary, not competitive.

<table>
<tr><th>No.</th><th>Directed to</th><th>Question</th></tr>
<tr><td></td><td></td><td>Attachments for the response:
<table>
<tr><th>Name</th><th>Link</th><th>Description</th></tr>
<tr><td>B2074900/A6S/A428/XX/RP/PM/00025</td><td></td><td>Option Assessment Report</td></tr>
<tr><td>HE551495-JAC-XXX-XX-RP-TR0013</td><td></td><td>Assessment of Alternative modes</td></tr>
<tr><td>HE551495-ACM-GEN-GEN_SW_Z_ZZ-RP-TR-0004 P06 S4, dated August 2020</td><td></td><td>Alternative Mode Assessment Report</td></tr>
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<tr><td>Q1.16</td><td colspan="2">Noise and Vibration</td></tr>
<tr><td>Q1.16.1</td><td colspan="2">Construction and Operational effects on sensitive reports</td></tr>
<tr><td>Q1.16.1.1</td><td>Applicant</td><td>Question:
Additional Receptors
ES [APP-080, paragraph 11.3.11] explains that receptors not present in Ordnance Survey (OS) data sets were identified during discussions with the Statutory Consultees during 2019 and 2020. The RR received from BBC [RR-008a] also questions the reliability of data as it is understood monitoring was undertaken in 2017 and as such is more than three years old. Can the Applicant explain how the baseline monitoring remains representative of the current environment in light of this additional development being identified and time that has elapsed since the monitoring was undertaken.</td></tr>
<tr><td></td><td></td><td>Answer:
A discussion of the baseline monitoring is provided in the Environmental Statement (ES) Chapter 11, Noise and Vibration [APP-080], paragraphs 11.6.16-11.6.23. As noted in paragraph 11.3.11 of the ES [APP-080], discussions during 2019 and 2020 were held with BBC and other local authorities with regard to carrying out additional monitoring.</td></tr>
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		This monitoring was intended to further supplement baseline monitoring undertaken in winter 2017; however, this additional monitoring was not progressed during 2020 due to the presence of non-standard traffic conditions resulting from the travel restrictions resulting from the Covid-19 pandemic. The purpose of the baseline noise survey is to assist with developing an understanding of the general noise climate along the proposed route of the Scheme. For example, to identify if any other local noise sources (other than road traffic) are present and contribute significantly to the local noise climate. In addition, the results of the baseline noise survey have been used as part of a validation exercise for the traffic noise prediction modelling by comparing predicted traffic noise levels with measured ambient levels. The validation exercise compared the baseline ambient noise levels measured during 2017 and the predicted traffic noise levels using 2016 traffic data. An exact match would not be expected for a variety of reasons, for example: i) The noise predictions are based on typical weekday traffic conditions over a year, not the exact traffic conditions during the few weeks or hours of noise monitoring. ii) The prediction method is designed to be conservative in terms of the effect of wind direction whereas the wind direction is likely to vary throughout the monitoring period. iii) Rhe noise predictions only consider road traffic noise, whereas the measurements include all ambient noise sources. The validation exercise concluded that at a majority of the locations where road traffic noise was dominant, there was a reasonable match between measured and predicted traffic noise levels. Further discussion of the comparison on the measured and modelled noise levels is provided in the ES Chapter 11, Noise and Vibration **[APP-080]**, paragraphs 11.6.18-11.6.23. Overall, the comparisons provide confidence that the noise model developed to estimate the noise impacts of the Scheme is robust. No significant changes in baseline conditions in the study area have been identified between 2017 and 2021, with the exception of the ongoing development at Wintringham and the redevelopment of the former site of St Neots Footgolf and Golf Centre on Potton Road with nine residential properties. As noted above, the validation exercise to compare the 2017 measured baseline ambient noise levels and the predicted traffic noise levels was completed using 2016 traffic data. Comparable baseline traffic data has not been collated for 2021. However, the scale and location of these developments to date will not change the baseline ambient noise levels reported in ES Chapter 11, Noise and Vibration **[APP-080]**. Taking the above into consideration, the Applicant considers that the baseline monitoring conditions reported in the ES Chapter 11, Noise and Vibration **[APP-080]** remain representative of the current environment. In addition, the

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		conclusion of the validation exercise remains valid as the 2017 monitoring data was compared to predictions using comparable traffic data.
Q1.16.1.2	Applicant	**Question:** **Additional monitoring** ES **[APP-080, paragraph 11.3.11]** states that consultation has been carried out with the Environmental Health Departments of BBC, CBC, HDC and SCDC and that discussions during 2019 and 2020 confirmed the councils' agreement in principle to conducting further baseline noise monitoring at one location in each local authority. It is noted that this additional monitoring was not progressed during 2020 due to the Covid-19 pandemic. The Applicant is asked to confirm the status of this data request. Provide any new data that has since been acquired.
		Answer: The Applicant confirms that no additional ambient noise measurements have been undertaken since 2017. As noted in paragraph 11.3.11 of the ES Chapter 11, Noise and Vibration [APP-080]. Discussions during 2019 and 2020 were held with BBC and other local authorities with regard to carrying out additional monitoring. This monitoring was intended to further supplement baseline monitoring undertaken in winter 2017; however, this additional monitoring was not progressed during 2020 due to the presence of non-standard traffic conditions resulting from the travel restrictions resulting from the Covid-19 pandemic. In accordance with the Design Manual for Road and Bridges (DMRB), measured baseline noise levels are not used to determine the magnitude of impact of the Scheme as this is based on future conditions both with and without the Scheme which it is not possible to measure. Therefore, additional monitoring will not change the assessment outcomes, including mitigation, as set out in the ES Chapter 11, Noise and Vibration **[APP-080]** and Environmental Masterplan [APP-091]. In addition, any additional monitoring will not change the outcome of the noise model validation process reported in the ES Chapter 11, Noise and Vibration **[APP-080]**, which concluded that the comparisons between the measured and predicted noise levels provide confidence that the noise model developed to estimate the noise impacts of the Scheme is robust.
Q1.16.1.3	Applicant	**Question:** **Construction – methodology** Given ES **[APP-080, paragraph 11.4.4]** explains that the exact construction method would be determined during the detailed design stage, can the Applicant confirm whether or not there is potential for alternative piling methods to be

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		used to construct new bridges and retaining walls?
		Answer: The use of a specific piling method is not currently secured in the draft Development Consent Order (dDCO) **[APP-025]** or the First Iteration Environmental Management Plan (EMP) **[APP-234]**. Rotary bored piling is proposed for bridge works and retaining walls, as noted in paragraphs 11.3.31, 11.7.3 and 11.9.24 in Environmental Statement (ES) Chapter 11, Noise and Vibration **[APP-080]**. The assessment has identified that significant adverse effects due to vibration annoyance from rotary bored piling activities are unlikely, with the distance to the nearest sensitive receptor (Greenacres in Roxton) being approximately 100m. Some flexibility will be required by the construction contractor, however, in the Second Iteration EMP, a commitment will be added to exclude the use of impact or vibratory piling in the vicinity of sensitive receptors, should such piling methods be proposed at the detailed design stage. If, as the design progresses, the contractor identifies that an alternative piling method would be preferred, then before adopting such an approach the contractor must demonstrate that it complies with the requirement to adopt Best Practicable Means (BPM) to minimise noise and vibration, as set out in paragraph 1.4.2 of the EMP **[APP-234]**.
Q1.16.1.4	Applicant	**Question:** **Operation – methodology** ES **[APP-080, paragraph 11.3.15]** explains that operational impacts resulting from vibration are scoped out of further assessment in accordance with DMRB. Impacts relating to vibration are considered to be more likely where receptors are identified as being within 100m of affected routes. As receptors are identified as being within 50m of affected routes can the Applicant provide the reasoning and evidence to support this decision.
		Answer: The consideration of vibration impacts due to the operation of the Scheme is scoped out of the assessment. A well-maintained road surface will be free of irregularities, so operational vibration will not have the potential to lead to significant adverse effects and this is reflected in DMRB guidance LA111. Highways England and the local Highway Authorities are responsible for the general maintenance of the road network. Vibration impacts likely to arise during the construction phase have been identified in accordance with DMRB guidance LA111. This identifies that a study area 100m from the closest construction activity with the potential to

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		generate vibration is normally sufficient to encompass all vibration sensitive receptors. Paragraph 11.3.30 of the Environmental Statement Chapter 11, Noise and Vibration **[APP-080]** identifies such activities to include construction works comprising of piling and works using vibratory rollers. These activities are only located within the Scheme extents and therefore do not include surrounding affected routes. The 50m operational traffic noise study area around affected routes, as defined in accordance with DMRB, has been used to identify the extent of noise impacts and likelihood of significant effects resulting from changes in traffic on these routes. There is no requirement to consider potential traffic vibration impacts along these routes and, as detailed above, significant adverse vibration effects from road traffic would not be anticipated.
Q1.16.1.5	Applicant	**Question:** **Significant noise effects of construction** Significant construction noise effects are identified at the closest receptors to the construction works. The affected receptors/locations are listed in ES **[APP-080, paragraph 11.9.8]**. The document states that as these effects would be of very short duration they are not identified as significant effects. Can the Applicant clarify what is considered to be a very short duration?
		Answer: The methodology for the identification of significant construction noise effects is set out in paragraphs 11.3.41 to 11.3.44 of ES Chapter 11, Noise and Vibration **[APP-080]** and is in accordance with the methodology set in DMRB LA 111. This requires both the magnitude of the impact and its duration to be taken into consideration when determining likely significant adverse effects due to construction noise. All the potentially significant construction noise effects based on the magnitude of impact are identified in Table 11-10 and discussed in paragraphs 11.9.5 and 11.9.6. The duration of the impact is then taken into consideration resulting in a potentially significant construction noise adverse effects being identified at the receptors listed in paragraph 11.9.8. Paragraphs 11.9.9 and 11.9.10 set out the activities which, based on the information provided by the Buildability Advisor, are very unlikely to meet the duration criteria as set out in the methodology, as described in paragraph 11.3.43 of Chapter 11, Noise and Vibration ES **[APP-080]**: a. Ten or more working days (or evenings/weekends or nights) in any 15 consecutive days.

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		b. More than 40 days (or evenings/weekends or nights) in any six consecutive months. With regard to applying the duration criteria, as set out in paragraph 11.9.7, a conservative judgement has been made and these criteria have only been applied to those activities for which there is certainty that the durations would be considerably below the criteria, taking advice from the appointed Buildability Advisor.
Q1.16.1.6	Applicant	**Question:** **Significant noise effects of construction** ES **[APP-080, paragraph 11.3.11]** states that consultation has been carried out with the Environmental Health Departments of BBC, CBDC, HDC and SCDC. Can the LAs confirm that they are in agreement with the assessment of significance and that there are no concerns regarding the mitigation provisions outlined, including the subsequent assessment stage?
		Answer: No response required from Applicant.
Q1.16.2	**Proposed mitigation, management and monitoring**	
Q1.16.2.1	Applicant	**Question:** **Effects of construction noise mitigation measures** ES **[APP-080, Paragraph 11.8.12]** explains that proposals for potential noise mitigation have been developed in conjunction with other environmental disciplines e.g. landscape and visual impacts. It is not obvious that the impacts of site hoardings and noise barriers and the potential interaction with landscape and visual impact has been addressed in either the assessment of noise and vibration or in Landscape and visual effect. Can the Applicant confirm how this has been considered within the assessments?
		Answer: In line with the criteria for "good design" set out in the National Policy Statement for National Networks (NPSNN), the Applicant can confirm that design has been an integral consideration from the outset and throughout the design process. The Applicant's landscape architects and noise specialists have worked closely to understand and address

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		the potential interactions between landscape, visual and noise impacts and this is reflected in the mitigation embedded in the Scheme design. Paragraph 11.8.12 of Chapter 11, Noise and Vibration **[APP-080]** of the Environmental Statement sets out the process undertaken to develop proposals for potential noise mitigation to minimise traffic noise impacts due to the operation of the Scheme, whilst avoiding secondary impacts such as visual and landscape. This process resulted in a number of noise bunds being proposed along the length of the Scheme; these are identified in the Environmental Masterplan **[APP-091]**. Although noise barriers have been considered as a solution to minimise operational traffic noise levels, these have not been included in the Scheme design. Further discussion of how noise barriers were considered and subsequently discounted is provided in Section 11.9 of Chapter 11, Noise and Vibration **[APP-080]** of the Environmental Statement. With regard to the assessment of construction noise impacts, as reported in Chapter 11, Noise and Vibration **[APP-080]** of the Environmental Statement, reasonable worst-case assumptions have been adopted to ensure the results of the construction noise assessment are robust. On this basis, no localised temporary site hoardings or noise barriers have been included within the modelling and assessment of construction noise impacts. The LVIA has considered the potential interaction between noise and vibration, landscape and visual effects. The assessment of construction and operational landscape effects includes detailed consideration of impacts on tranquility, which relates to the perceptual aspects of landscape character, including noise. Reference is made to the Campaign to Protect Rural England (CPRE) mapping of tranquility reproduced in Figure 7.6 **[APP-107]** of the Environmental Statement. This demonstrates that the tranquility across the study area is generally in the mid-range, although it decreases in relation to the settlements and parts of the road network such as along the A1, the existing A428 to the south of St Neots and along elevated sections of Potton Road at its junction with the B1046. Annex K of the First Iteration Environmental Management Plan **[APP-234]** comprises the Construction Compound Management Plan for the Scheme. This "*details the practical measures to be implemented by the Principal Contractor (PC) in relation to the management of the Scheme's main site compounds and satellite compounds.*" It includes the provision of fences or hoarding as appropriate for security, which have been considered and are referred to where relevant in the context of the wider construction activity in Appendix 7.3 **[APP-181]** and Appendix 7.4 **[APP-182]** of the Environmental Statement. As noise barriers have not been included in the assessment of construction noise, these have not been considered within the Landscape and Visual Impact Assessment reported in Chapter 7, Landscape and Visual Effects **[APP-076]** of the Environmental Statement. Noise mitigation measures embedded into the design of the Scheme have also been considered in the visual assessment. Where noise bunds are proposed, for example west of the B1046 Potton Road, the landscape design

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		principles set out in Annex L of the First Iteration Environmental Management Plan **[APP-234]** have been applied to integrate the earthworks into the surrounding topography through land profiling and planting.
Q1.16.2.2	Applicant	**Question:** **Design and limits of deviation** ES **[APP-080, Section 11.4]** considers the design and limits of deviation. As length, elevation, proximity to receptors and the materials used can alter and potentially change noise and or vibration impact, and as the proposals for the use of hoardings and noise barriers would not be developed until detailed design stage, can the Applicant explain how the certainty of the effectiveness of the mitigation within the limits of deviation has been determined.
		Answer: Section 11.4 of the ES Chapter 11, Noise and Vibration **[APP-080]** summarises how any potential lateral and/or vertical deviation has been considered to assess any potential change in the noise and vibration impacts and effects associated with the proposed Scheme, the latter as described in ES Chapter 2, The Scheme **[APP-071]**. With regard to the assessment undertaken to assess construction noise impacts, reasonable worst case assumptions have been adopted. This ensures that the results of the construction noise assessment are robust. On this basis, no localised temporary site hoardings or noise barriers have been included in the assessment of construction noise impacts at this stage. Therefore, the potential attenuation provided by any such localised barriers at sensitive receptors has not been quantified at this stage. Details of the temporary site hoardings/noise barriers will be developed during the detailed design phase. It is considered that the construction noise impacts reported in the ES are unlikely to be worse once the attenuation of the site hoardings or noise barriers is taken into account, even if any lateral or vertical changes are applied to the Scheme within the limits of deviation set out in the Works Plans (**[APP-009]** and **[APP-010]** and defined within the draft Development Consent Order (dDCO) **[APP-025]**). With regard to the assessment undertaken to assess operational noise impacts, no noise barriers have been proposed. However, noise bunding has been embedded into the proposed Scheme design, as set out in the Environmental Masterplan **[APP-091]** and these would still be deliverable within the limits of deviation, as noted in paragraph 11.4.3 of Chapter 11, Noise and Vibration of the ES **[APP-080]**. Whilst it is recognised that there is the potential for lateral or vertical deviation to result in different impacts to those reported in the ES, changes in significant effects are considered unlikely.

No.	Directed to	Question
		The Limits of Deviation (LoD) are secured through Article 9 of the dDCO **[APP-025]** and the detailed design stage would be undertaken ensuring that the Scheme complies with the principles of the Rochdale Envelope (as explained in PINS advice note 9: Rochdale Envelope -Version 3 (July 2018)).
Q1.16.2.3	Applicant	**Question:** **Mitigation at specific receptors** The EMP lacks clarity regarding the mitigation measures proposed at specific receptors, and the likely effectiveness of such mitigation. The Applicant is asked to provide this information in a table format.
		Answer: Annex B of the First Iteration Environmental Management Plan (EMP) **[APP-234]**, sets out the generic measures which will be used by the contractor to control noise and vibration during the construction phase. These generic measures will be expanded upon to determine the specific mitigation measures to be applied to individual construction activities or receptors. It is not possible to determine specific mitigation measures at this stage before the details of the construction works are finalised. On this basis, no localised temporary site hoardings or noise barriers have been included in the assessment of construction noise impacts at this stage. This ensures that the results of the construction noise assessment are robust. The EMP includes a commitment to develop a Noise and Vibration Management Plan to be contained within the Second Iteration EMP which will detail the management and monitoring to be applied at all construction sites. This will build on the generic measures set out in the EMP **[APP-234]** and will include adopting industry standard practice to: • Apply Best Practicable Means as defined in Section 72 of Control of Pollution Act. • Integrate noise control into preparation of all method statements for construction activities. This would include the selection of low noise plant, siting plant away from receptors where possible to minimise noise disturbance, using acoustic enclosures, using temporary site hoardings/barriers and using less intrusive reversing alarms. • Develop and implement noise monitoring protocols – locations, duration, methods to publish data. • Develop procedures for installing noise insulation and temporary rehousing residents where it is not possible to mitigate construction noise below relevant trigger levels as defined by BS 5228.

No.	Directed to	Question
		• Develop a process to ensure ongoing compliance with the Noise and Vibration Management Plan and for corrective actions required to address non-compliance. As noted in Paragraph 1.1.8 of the EMP **[APP-234]**, the proposed mitigation measures embedded in the Scheme design to minimise operational noise are shown on the Environmental Masterplan on Figure 2.4 of the ES **[APP-091]**. These measures include the installation of both low noise surfacing materials throughout the Scheme and 3m high noise bunding in the vicinity of Roxton and Potton Road. Further details of these measures are provided in Table 7 of the ES Schedule of Mitigation **[APP-235]**, which include the performance assumed for low noise surfacing materials. As the 3m high noise bunding is embedded within the Scheme design, their effectiveness in reducing traffic noise at nearby sensitive properties has not been explicitly quantified.
Q1.16.2.4	Applicant	**Question:** **Offsite noise barriers** a) Can the Applicant confirm whether or not the use of offsite noise barriers has been considered as a potential means of reducing adverse effects. b) Can the Applicant explain how it has been determined that the additional reductions would be limited to 1dB(A).
		Answer: a. As set out in the responses to Question 1.16.2.3 and paragraph 11.8.4 of Chapter 11, Noise and Vibration of the ES **[APP-080]**, the assessment of construction noise impacts as reported in Chapter 11, Noise and Vibration ES **[APP-080]** does not include localised temporary site hoardings/noise barriers. This ensures that the results of the construction noise assessment are robust. The need for localised temporary site hoardings/noise barriers, including their location, will be determined through the detailed design phase and included in the Noise and Vibration Management Plan, which will form part of the Second Iteration Environmental Management Plan. Whilst both onsite and offsite locations would be considered at detailed design stage, onsite locations would be preferred due to issues including, but not limited to land access permissions, maintaining access to properties, visual impacts and ongoing maintenance. In addition, noise barriers are generally most effective and practical when located as close as possible to the source. For similar reasons, no offsite noise barriers have been proposed as a means of reducing adverse effects from operational traffic noise. However, a range of mitigation measures have been embedded into the Scheme design to minimise adverse impacts, including cuttings, noise bunds and low noise surfacing materials. Further details of these measures are set out in Table 7 of Chapter 6.9 Schedule of Mitigation of the Environmental Statement **[APP-235]**.

No.	Directed to	Question
		b. Paragraphs 11.9.45 and 11.9.59 of Chapter 11, Noise and Vibration of the ES **[APP-080]** discuss the further work undertaken to identify the effectiveness of additional noise mitigation measures, in the form of 1m high barriers on top of proposed noise bunding, in reducing traffic noise impacts at nearby sensitive receptors in the vicinity of Roxton and Potton Road. The reductions in traffic noise provided by these 1m high barriers, which were limited to 1dB(A) at the closest sensitive receptors, were determined through noise modelling.
Q1.16.2.5	Local Authorities	**Question:** **Monitoring** Monitoring requirements are described in the ES **[APP-080, Section 11.10]**. The LAs are asked to confirm whether or not they are satisfied with the monitoring arrangements proposed.
		Answer: No response required from Applicant.
Q1.16.2.6	Applicant	**Question:** **Consultation** The RR provided by BBC **[RR-008a]** raises queries regarding the detail of proposed borrow pits and their associate impacts. Predicted noise levels at selected representative receptors during the construction phase are presented in the ES **[APP-212, Appendix 11.3]**. a) Can the Applicant confirm which receptors have been considered representative in the assessment of background noise for each of the short-listed potential borrow pit sites? Construction works listed in the noise report include utility works, site clearance, earthworks wall construction bridge demolition and road works. a) Can the Applicant specify what the earthworks are and if this description includes the borrow pits? b) Can the Applicant provide further information regarding the means of mitigation for, and more specifically to the potential re-siting of borrow-pits. (See related questions in *Construction Methods and Effects*)

No.	Directed to	Question
		Answer: a. The construction noise assessment reported in paragraphs 11.9.2 - 11.9.13 in Chapter 11, Noise and Vibration of the ES **[APP-080]** is based on predicting the impact at a selection of 45 of the closest identified potentially sensitive receptors located along the works. As discussed in paragraph 11.5.2 of Chapter 11, Noise and Vibration of the ES **[APP-080]**, the individual receptors have been chosen based on their potential sensitivity as defined in DMRB and receptor proximity to the various works including, but not limited to, the potential location of the borrow pits. These individual receptors are shown on Figure 11-1 of the ES **[APP –143]**. Those locations which are close to the potential borrow pits include: R08 (10 Roxton Road, Chawston), close to borrow pit Site 11. R15A (9 Great North Road, Chawston - west façade), close to borrow pit Site 14. R15B (9 Great North Road, Chawston - south façade), close to borrow pit Site 14. R38 (Pembroke Farmhouse, Pembroke Farm, Cambridge Road, Eltisley), close to borrow pit Site 3. R40A (Iway Inn, Ermine Street South, Papworth Everard - south west facade) – close to borrow pit Sites 3 and 4. R40B (Iway Inn, Ermine Street South, Papworth Everard - south facade)– close to borrow pit Sites 3 and 4. R44 (Common Farm Cottages, Brockley Road, Elsworth) – close to borrow pit Site 4. The ambient noise levels on which the construction noise criteria are based have been estimated using 2025 Do Minimum traffic data. As discussed in paragraph 11.6.29 in Chapter 11, Noise and Vibration of the ES **[APP-080]**, this data is considered to reflect the traffic conditions likely to occur during construction. b. Paragraph 11.7.2 of Chapter 11, Noise and Vibration of the ES **[APP-080]** provides a summary, rather than an exhaustive list of the activities included in the construction noise assessment. The Applicant confirms that the earthworks referenced in the paragraph include those associated with both the construction of cuttings and embankments along the proposed Scheme alignment, and the excavation and backfilling of all potential borrow pits. c. Whilst potentially significant construction noise effects are identified at receptors R08, R15A, R15B and R40B as set out in paragraph 11.9.8 of Chapter 11, Noise and Vibration of the ES **[APP-080]**, the sources of these significant effects are not directly related to the excavation and refilling of the borrow pits. Reasonable worst-case assumptions have been adopted in the assessment of construction noise impacts, including those associated with borrow pits. For example, specific mitigation at the borrow pits such as localized bunding/hoarding has not been

No.	Directed to	Question
		included in the assessment at this stage. This ensures that the results of the construction noise assessment are robust. As set out in response to written question Q1.16.2.3, mitigation measures including the adoption of Best Practicable Means and localised bunding/hoarding will be confirmed at detailed design stage once the details of the construction works are finalized. This is secured through the First Iteration Environmental Management Plan **[APP-234]**. No mitigation is proposed regarding the possible re-siting of the borrow pits; this is because the Applicant has undertaken a thorough and comprehensive site selection, appraisal and evaluation process to inform the selection of its preferred locations for these features. Potential noise impacts formed part of this selection process through consideration of the proximity of the potential sites to noise sensitive receptors. Full details of this process are reported in the Borrow Pits Optioneering Report **[APP-246]**.
Q1.17	**Significant Cumulative Effects**	
Q1.17.1	**Approach to assessment**	
Q1.17.1.1	Applicant Local Authorities	**Question:** **Methodology and mitigation** The Applicant has drawn a distinction between combined effects (where an individual receptor is affected simultaneous by more than one type of impact, such as noise, air quality and visual impact, as a result of the Proposed Development) and cumulative effects (where the effects of the Proposed Development are assessed alongside the effects of other proposed schemes on a single receptor) **[APP-084, Section 15.3]**. a) Have you assessed cumulative and combined effects for receptors effected by construction traffic? Explain with reasons. b) LAs to comment.
		Answer: **a)** The Applicant can confirm that, as presented in paragraphs 4.2.32 to 4.2.36 of Chapter 4, Environmental Assessment Methodology of the Environmental Statement **[APP-073]**, a construction traffic model was developed for the Scheme

No.	Directed to	Question
		to establish the likely number of freight vehicles and cars that would be added to the road network during each phase of Scheme construction. The calculated movements from this modelling were used to inform the assessments of Chapter 5, Air Quality **[APP-074]**, and Chapter 11, Noise and Vibration **[APP-080]** as, in accordance with the requirements of the Design Manual for Roads and Bridges (DMRB) standards LA 105 & LA 111, both of these topics require the consideration of such forecasts when undertaking construction-based assessments. Under their respective DMRB standard, none of the remaining environmental assessment topics reported within the Environmental Statement are required to specifically evaluate quantitative traffic forecasts when undertaking construction-phase assessments. Notwithstanding this, some of these assessment topics (where applicable) have involved the qualitative evaluation of the changes that may occur from alterations in the volume and composition of traffic during construction works – for example, Chapter 7, Landscape and Visual Effects **[APP-076]** assessment has assessed how construction vehicles, temporary traffic management, traffic diversions and construction vehicle lighting would feature in available views from sensitive visual receptors. The reported effects of construction-based assessments within all ten of the environmental topics assessed and reported within the Environmental Statement were carried forward by the Applicant for review as part of the Chapter 15, Assessment of Cumulative Effects **[APP-084]**, the purpose being to identify the potential for these effects to combine together and result in significant effects on receptors. A review of these reported effects identified that significant effects on receptors would likely occur in relation to the visual impacts, noise impacts, vibration impacts and air quality impacts of the Scheme combining, as described in paragraph 15.5.1 of Chapter 15 Assessment of Cumulative Effects **[APP-084].** Accordingly, the Applicant can confirm that the cumulative effects assessment has appropriately considered the combined effects on receptors of construction traffic by virtue of this being a component assessed within the construction-based assessments of Chapter 5, Air Quality **[APP-074]**, Chapter 7, Landscape and Visual Effects **[APP-076]** and Chapter 11, Noise and Vibration **[APP-080]**. In relation to identifying the likely interactive effects between the Scheme and other developments, Appendix 15.2 **[APP-228]** presents the outcomes of this assessment in the form of a matrix. This concluded that significant cumulative effects would be likely on areas of local landscape character, sensitive visual receptors, and receptors sensitive to noise and vibration, all of which are environmental topics that have inherently considered the effects of construction traffic within them (as described above).

No.	Directed to	Question
Q1.17.2	**Assessment of cumulative effects**	
Q1.17.2.1	Local Authorities Applicant	**Question:** **Approach** a) LAs, are you satisfied with the Applicant's approach to shortlisting other proposed schemes for assessing cumulative effects **[APP-084, Section 15.3]**? b) LAs, do you agree with the five other proposed schemes that h
		Answer: The ExA's questions set out that question 1.17.2.1 requires a response from the Applicant, however it appears that both parts of the question are directed at the local authorities. As such, the Applicant will not be responding to this question.
Q1.17.2.2	Local Authorities Applicant	**Question:** **Proposed mitigation** The ES states that three other proposed schemes are predicted to cause significant cumulative effects with the Proposed Development. However, the Applicant has proposed no additional mitigation measures above those presented within the First Iteration EMP **[APP-084, Section 15.7] [APP-229]**. a) LAs are you content with this approach. b) Applicant provide justification.
		Answer: b) Chapter 15, Assessment of Cumulative Effects **[APP-084]** of the Environmental Statement has recorded that, post-mitigation, significant cumulative environmental effects are likely to occur as a result of the effects of the Scheme interacting with those associated with the following development projects: • Wintringham (Ref: 17/02308/OUT). • Cambourne (Ref: S/2903/14/OL).

No.	Directed to	Question
		• Loves Farm (Ref: 1300388OUT & 01015500OUT). The assessment of potential interactions concluded that, of the six cumulative effects identified, four effects would be confined to the construction phase of the Scheme (i.e. be temporary in nature) and two effects would occur during the first 15 years of Scheme operation (i.e. be more permanent in nature). The following parts of the Applicant's response provide context to each of these recorded effects and explain why no additional embedded or essential mitigation measures are required. <u>Temporary significant cumulative landscape effects</u> In relation to the temporary significant cumulative effects identified on local landscape character, the Applicant can confirm that the contributing construction-phase effects of the Scheme were, individually, assessed as being: • Large Adverse (Significant) on Local Landscape Character Areas LLCA08 (accommodating the Wintringham development) and LLCA11 (accommodating the Loves Farm development). • Moderate Adverse (Significant) on Local Landscape Character Area LLCA14 (accommodating the vast majority of the Cambourne development). Based on these construction effects potentially interacting with the landscape effects of all three developments, temporary Moderate Adverse (Significant) cumulative effects were recorded in the assessment. As the individual landscape effects of the Scheme are equal or greater in significance than the cumulative effect declared, no additional essential mitigation measures were identified as being required by the Applicant in respect of further reducing the Scheme's contribution to those overall effects. <u>Temporary significant cumulative visual effects</u> In relation to the temporary significant cumulative visual effects identified on visual receptors, the Applicant can confirm that the contributing construction-phase effects of the Scheme were, individually, assessed as being: • Large Adverse (Significant) on Receptor R108 [1 – 4 Common Farm Cottages]. Based on this construction effect potentially interacting within the visual effects of the Cambourne development, a temporary Moderate Adverse (Significant) effect was recorded in the assessment. As the individual visual effect of the Scheme was equal in significance to the cumulative effect declared, no additional essential mitigation measures were identified as being required by the Applicant in respect of further reducing the Scheme's contribution to this overall effect.

No.	Directed to	Question
		Temporary significant cumulative noise effects In relation to the temporary significant cumulative noise effects identified on sensitive receptors, the Applicant can confirm that the contributing construction-phase effects of the Scheme were, individually, assessed as being: • Significant Adverse on Receptor R25 ["Greyholme", located adjacent to Cambridge Road/A428 Roundabout]. Based on this construction effect potentially interacting within the visual effects of the Wintringham development, a temporary Moderate Adverse (Significant) effect was recorded in the assessment. As the individual noise effect of the Scheme was identified as likely to be "significant" and therefore comparable to the significance to the cumulative effect declared, no additional essential mitigation measures were identified as being required by the Applicant in respect of further reducing the Scheme's contribution to this overall effect. Permanent significant cumulative visual effects In relation to the permanent significant cumulative visual effects identified on visual receptors, the Applicant can confirm that the contributing operational-phase effects of the Scheme were, individually, assessed as being: • Moderate Adverse (Significant) on R104 [Swansley Farm] in year one of Scheme operation, reducing in significance to Slight Adverse (Not Significant) by year 15 following the establishment of planting (embedded mitigation). • Moderate Adverse (Significant) on R66 [Tithe Farm] in year one of Scheme operation, reducing in significance to Slight Adverse (Not Significant) by year 15 following the establishment of planting (embedded mitigation). Based on these operational effects potentially interacting within the visual effects of the Cambourne and Loves Farm developments, a temporary Moderate Adverse (Significant) effect was recorded in the assessment at year one of Scheme operation as the planting would not have established or be fulfilling its intended function. As the individual visual effects of the Scheme were equal in significance to the cumulative effects declared, no additional embedded or essential mitigation measures were identified as being required by the Applicant in respect of further reducing the Scheme's contribution to those overall effects. First Iteration Environmental Management Plan Although no additional mitigation measures are proposed within the First Iteration Environmental Management Plan **[APP-234]**, the Applicant can confirm that the standard best-practice construction measures, approaches and controls contained within this document would be implemented by the Scheme's Principal Contractor during the works. Similar measures would be applied by the contractors appointed by the developers of the other projects.

No.	Directed to	Question
		Should construction activities between the Scheme and these other projects coincide, the Scheme's Principal Contractor would liaise with their developers to, where possible, co-ordinate site activities in a manner that minimises the risk of cumulative environmental effects. As part of its commitment to community engagement, the Scheme's Principal Contractor would also undertake liaison to ensure local businesses and communities are informed of any potential development interactions and heightened activity/disruption that could occur during the Scheme's construction phase.
Q1.17.3	**Assessment of combined effects**	
Q1.17.3.1	Local Authorities Applicant	**Question:** **Proposed mitigation** Applicant, you have identified four receptors which would experience large adverse combined effects, and numerous others would experience moderate adverse effects **[APP-084] [APP-112]**. a) Applicant, explain your position that no additional mitigation measures are proposed to alleviate the combined effects. b) LAs, do you agree with Applicant's position. If not, what additional mitigation would be appropriate and effective, particularly for the four receptors that are worse effected.
		Answer: With regard to the combined effects noted by the ExA, Chapter 15, Assessment of Cumulative Effects **[APP-084]** of the Environmental Statement has recorded that, post-mitigation, combined significant environmental effects of Large Adverse and Moderate Adverse significance are likely to occur temporarily during the Scheme's construction-phase. The Applicant can confirm that, for all receptors identified within the construction-phase combined assessment, the mitigated contributing effects of the Scheme on the visual environment, noise, vibration and air quality were, individually, assessed as being of an equal or greater significance than the significant combined effect reported. In relation to the four worst affected receptors, the combined assessment of construction-phase effects recorded that the Large Adverse (Significant) ratings ascribed to each receptor have an individual contributing visual effect rated as being Very Large Adverse (Significant), which is greater in significance than the combined effect. Accordingly, as the individual construction-phase effects of the Scheme will be mitigated as far as reasonably practicable by the Applicant through the standard and best practice measures set out within the outline management

No.	Directed to	Question
		plans contained within the First Iteration Environmental Management Plan **[APP-234]**, no additional essential mitigation measures have been identified as being required to reduce the significance of the combined effects, or the individual effect ratings that would contribute to those combined effects.
Q1.17.4	**East West Rail**	
Q1.17.4.1	East West Rail Company Limited Applicant Local Authorities	**Question:** **East West Rail** a) EWR, provide brief background for the EWR scheme and any specific national policy positions (such as NPS NN, NPPF) or local policy positions or approvals that would support your representation. b) EWR, your submission **[AS-004]** states that there are likely to be significant engineering interfaces between your scheme and the Proposed Development. Explain what these are. c) EWR, explain if the Proposed Development could, and in what ways, affect the likely deliverability of the intended EWR scheme? d) EWR, what is the appropriate protection that you wish to seek for your scheme that you believe can be secured in this Examination. How do you believe these protections can be secured? e) EWR, explain the modification to the dDCO that you would require. f) Applicant may comment to any of the questions above. g) Applicant, with reference to Advice Note 17, explain with reasons if EWR should be included in the assessment of cumulative effects in the ES? EWR may comment. h) Applicant and EWR, explain if efficiencies could be made if there was greater collaboration between the Proposed Development and the EWR scheme, particularly in terms of land take and loss of functional BMV agricultural land? LAs may also comment.
		Answer: **f)** The Applicant does not wish to make any comment at this stage on the questions and requests that are directed to the East West Rail Company by the ExA. The Applicant will submit any response in line with Deadline 2.

No.	Directed to	Question
		g) The assessment of cumulative effects reported in the Environmental Statement in **[APP-084]** has been undertaken in accordance with the four-stage assessment approach contained in the Planning Inspectorate's *Advice note seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects (version 2)* (2019). This required the Applicant to first establish a long list of 'other existing development and/or approved development'. The long list of developments identified in Stage 1 of the assessment included, amongst others, the "East West Railway" proposals, which are referenced as ID002 in Appendix 15.1 of the Environmental Statement **[APP-228]** (hereafter the "East West Rail project"). All identified development plans and projects were first allocated into different tiers based on their status, their geographical relationship to the Scheme, the availability of information regarding their likely environmental effects, and their anticipated delivery timescales. In accordance with *Advice note seventeen*, the Applicant categorised the East West Rail project as a Tier 3 development at Stage 1 on the basis that a scoping report had not yet been prepared for the East West Rail project, and because project information within the public domain was very limited at that time. As the Stage 1 assessment recorded potential for the East West Rail project to interact environmentally with the Scheme due to its possible geographical and temporal relationships, this development was progressed to Stage 2 of the assessment. Stage 2 of the assessment acknowledged that whilst the scale and nature of the East West Rail project would, itself, likely result in significant environmental effects, it was not possible to shortlist this development for inclusion in the cumulative effects assessment at Stages 3 and 4 because very limited information was available regarding: a) its likely environment effects; b) the coverage and extent of its effects; and c) when its effects might occur. Accordingly, the East West Rail project was discounted from further consideration as it was concluded that the absence of this information prevented a meaningful cumulative effects assessment being undertaken. Notwithstanding this conclusion, the Applicant continues to review the status of the East West Rail project and its progression through statutory procedures. In the event of a scoping report or similar environmental information being published for the East West Rail project prior to, or during, the DCO Examination, the Applicant will update its status within Chapter 15, Assessment of Cumulative Effects **[APP-084]**. **h)**

No.	Directed to	Question
		The Applicant and the East West Rail Company have collaborated as far as practicable given the different stages of development of their respective projects. Current indications suggest East West Rail will be consulting on the preferred alignment of their project at the time the Applicant will be concluding the detailed design of its Scheme, indicating a significant gap in the timeline between the two projects. Efficiencies where both projects interact with the same local roads and utilities will be considered when further detail is available to fully assess the impacts. However, given the A428 Scheme is so far advanced these opportunities will be reviewed against any cost or other implications including delays to the Scheme initially and then the East West Rail project.
Q1.18	**Socio-economic effects**	
Q1.18.1	**Methodology**	
Q1.18.1.1	Applicant Local Authorities	**Question:** **Human health study area** The ExA notes that study area for human health in the ES **[APP-081, Section 12.5]**. Should the effect on mental and physical health also be considered for receptors (particularly residential receptors) that will experience large and moderate adverse combined effects **[APP-084] [APP-112]**? LAs to comment.
		Answer: The assessment of health impacts in Chapter 12, Population and Human Health **[APP-081]** of the Environmental Statement was undertaken based on the methodology set out in DMRB standard LA 112 - Population and human health. This involved the identification and assessment of impacts during construction and operation of the Scheme on defined parameters within that standard. As stated in the Applicant's response to Public Health England's Relevant Representation, 085(d) [RR-085] those parameters are namely accessibility, physical activity, air quality, noise and vibration, and road safety. Consideration is given to the potential for impacts on mental health albeit indirectly through assessing an outcome in respect of each parameter. In line with the standard, mental and physical health are not parameters requiring identification, assessment and evaluation, nor were these matters raised by the Planning Inspectorate as requiring consideration in its Scoping Opinion **[APP-231]**. The effects of the Scheme on these two parameters of human health have therefore not been

No.	Directed to	Question
		considered as part of the assessment reported in Chapter 12, Population and Human Health **[APP-081]** of the Environmental Statement. Accordingly, effects on mental and physical health were not carried forward into Chapter 15, Assessment of cumulative effects **[APP-084]** with regards to combined effects on residential receptors. Therefore, the Applicant does not consider that any further work on the effect of the Scheme on mental and physical health for residential receptors is necessary.
Q1.18.2	**Local and national economic activity and employment**	
Q1.18.2.1	Applicant	**Question:** **Economic activity and employment** Highlight the benefits of the Proposed Development in terms of direct and indirect job creation.
		Answer: One of the Scheme objectives relates to 'Economic Growth' and seeks to "Enable growth by improving connections between people and jobs and supporting new development projects." Paragraph 4.6.22 of the Case for the Scheme **[APP-247]** sets out that at a local level, the Scheme is included or acknowledged in Host Authorities' adopted and emerging Development Plans and transport strategy documents. These documents also set out that substantial housing and employment growth will be delivered over the relevant plan periods. The Scheme would play an important part in facilitating this planned growth. The numbers of new jobs that the local plans anticipate will be delivered is set out in Paragraphs 4.6.23 to 4.6.31 of the Case for the Scheme **[APP-247]** and summarised below: • Bedford Borough Local Plan – 6,900 new jobs by 2030. The Local Plan sets out that the planned growth will be unlocked by the delivery of planning infrastructure schemes, including the Scheme. • Emerging Central Bedfordshire Local Plan – 24,000 new jobs over the 2015-2035 plan period. The Central Bedfordshire Infrastructure Delivery Plan sets out that delivery of the Scheme is critical to deliver growth over and above what is identified within the Local Plan.

No.	Directed to	Question
		• Huntingdonshire Local Plan – 14,400 additional jobs between 2011 and 2036. This includes 22 hectares of employment land at Wintringham, a site that is located east of St Neots, adjacent to the Scheme. • South Cambridgeshire Local Plan – 22,000 new jobs by 2031. In terms of direct job creation, it is anticipated that the Scheme will create jobs during the construction phase by attracting, recruiting, developing and retaining talented people from all demographic groups within the local region. This will be reflected in the Education, Employment and Skills Plan that will be developed by the Principal Contractor. It will include, but not be limited to, targeting employing through Women's Returner Networks, Military Career Transition partnerships, engagement with Probation services, supporting NEETS and local unemployment programmes.
Q1.19	**Water quality and resources**	
Q1.19.1	**General**	
Q1.19.1.1	Environment Agency Local Authorities Natural England	**Question:** **General** There is scope for the construction and operation of the proposed scheme to affect the water environment, including water quality. a) Are you satisfied that construction activities and water use from the scheme would not cause harm to the water environment and the species that live in or around it **[APP-082]**? b) Are you satisfied that the risk of pollution from the scheme, both during construction and operation and both direct and indirect, would not cause harm to the water environment and the species that live in or around it **[APP-082]**?
		Answer: No response required from Applicant.

Appendix to Q.1.3.2.1

Topic	Highways England Metric	Metric 2.0	Metric 3.0
Habitat distinctiveness	Three categories; low, medium and high. All woodland habitat types are of high distinctiveness, apart from mixed woodland plantation (medium) and coniferous plantation on non-ancient woodland sites (low). All hedgerows are of high distinctiveness.	Three categories; low, medium and high. Semi-natural broadleaved woodland, semi-natural coniferous woodland and semi-natural mixed woodland are of high distinctiveness. Plantation broadleaved woodland and plantation mixed woodland are of medium distinctiveness. Plantation coniferous woodland is of low distinctiveness. Hedgerow habitats can be of varying distinctiveness scores.	Three categories; low, medium and high. The following distinctiveness changes have been made in Metric 3.0 from Metric 2.0: • Woodland pasture and parkland and felled woodland have increased to very high distinctiveness and sea buckthorn scrub (other) has decreased to low. • Bracken has decreased to low distinctiveness; extensive green roofs have decreased to low and intensive green roofs have increased to medium. • Allotments have decreased to low distinctiveness. • Non-priority habitat ponds and ornamental pond have decreased to medium distinctiveness. • Intertidal habitats have increased in distinctiveness e.g. Intertidal sediment – Artificial littoral coarse sediment is medium; intertidal sediment – Artificial littoral sand and muddy sand is medium; Intertidal sediment – Artificial littoral mud is medium; Intertidal sediment – Artificial littoral biogenic reefs are high. • Native hedgerow with trees and native species rich hedgerow with trees have

Topic	Highways England Metric	Metric 2.0	Metric 3.0
			increased to high. Native species rich hedgerow with trees associated with bank or ditch have increased to very high. • New categories have been added into the river metric categories, and Other rivers and streams have increased to high.
Risk multipliers	No risk multipliers considered.	Risk multipliers considered include habitat connectivity, strategic significance, time to target condition, difficulty of creation/enhancement and spatial multipliers.	Risk multipliers considered include difficulty of creation/enhancement, time to target condition and spatial risk (incorporates both strategic significance and the relationship between the site and off-site compensation where necessary). Assessment of strategic significance has updated guidance where a habitat can only be high if specifically highlighted within the local plan/relevant planning documents. Has resulted in more consistent assessment and less weighting on professional opinion. The Ecological connectivity multiplier has been removed.
Target condition	All created habitats are set to poor condition. There are no options for habitat enhancement.	Created/enhanced habitats can be of poor, fairly poor, moderate, fairly good or good condition if considered achievable by a professional and interventions with reference to the condition sheets are clearly specified. There is also an option for "accelerated succession" within the metric.	Created/enhanced habitats can be of poor, fairly poor, moderate, fairly good or good condition if considered achievable by a professional and interventions with reference to the condition sheets are clearly specified. There is no option for "accelerated succession" within the metric.

Topic	Highways England Metric	Metric 2.0	Metric 3.0
			Specific habitats have had their associate "time to target conditions" updated from Metric 2.0. For example: • There are lower "time to target conditions" for woodland – now 30 years maximum (decreased from 32 years). • Lower "time to target condition for floodplain wetland mosaic" (5 years for poor condition decreased from 10 years) • Native species rich hedgerow, native hedgerow and native hedgerow associated with bank or ditch - 12 years for good condition, increased from 10yrs in Metric 2.0. • For wetland habitats, the time to maximum target condition is 30+ years (decreased from 32+years), blanket bog takes 30+ years for all conditions and most condition times have been reduced.
Data entry	Metric uses Phase 1 habitat classification system	Metric uses UK HABS classification system.	Metric uses UK HABS classification system.
Advance / delay creation or enhancement	No function to allow the advance or delay of habitat creation / enhancement	No function to allow the advance or delay of habitat creation / enhancement	New function to recognise habitats to be created/enhanced in advance reduces delivery risk and delayed creation/enhancement to recognise the temporal impacts of phased development

Topic	Highways England Metric	Metric 2.0	Metric 3.0
Difficulty of creation / enhancement	Difficulty of creation and enhancement is not a multiplier considered within the metric.	Difficulty of creation and enhancement is considered within the metric i.e. "low, medium and high" difficulty.	Difficulty of creation and enhancement is considered within the metric and some difficulty scores vary from Metric 2.0. For example, hazel scrub has a lower difficulty score, difficulty of creation and enhancement now "low" for other woodland and other mixed woodland (down from medium and lower difficulty of enhancement for floodplain wetland mosaic.
Area and linear habitats	All habitats entered as area measurements into the metric and outputs in biodiversity units.	Habitats are differentiated into area-based (ha) and linear-based habitats (km) and measured in separate habitat, hedgerow and river metrics. The outputs are provided in habitat units, hedgerow units and river units respectively	Habitats are differentiated into area-based (ha) and linear-based habitats (km) and measured in separate habitat, hedgerow and river metrics. The outputs are provided in habitat units, hedgerow units and river units respectively.
Ditches	Entered into the metric as an area-based habitat (ha).	Entered into the metric as an area-based habitat (ha).	Ditches which meet the criteria (permanently wet for >4 months of the year) are entered into the metric as a linear habitat (km) within the river metric.
Rivers & Riparian zone	Running water is entered as an area-based measurement (ha) and the riparian zone is not considered.	Running water is a linear-based habitat measured in km. River Naturalness Assessment and Priority River Habitat is used to categorise the distinctiveness. 3 categories – Rivers – Priority Habitat Rivers and Streams of very high hydromorphological & ecological status, Rivers – Rivers & Streams of high distinctiveness and/or naturalness statues and Rivers & Streams (Other).	Includes all features within the 2.0 Metric but is subject to the following changes/inclusions: • High distinctiveness river types are all classified as 'Priority Habitat' all others, excluding canals, are classified as 'Other Rivers and Streams'. • Ditches which meet the criteria are classified as linear within 'Other Rivers Streams' and are subject to a new condition assessment.

Topic	Highways England Metric	Metric 2.0	Metric 3.0
		Condition assessment is based on the extent and diversity of the features within the river channel and the riparian zone and utilises a River Metric Survey (the Morph Modular survey[5]). Riparian zone is defined as a 10m zone from the top of the riverbank and is considered a linear feature within the river. Metric accounts for varying degrees of riparian encroachment which are entered within the calculator.	• Culverts have been added with a fixed condition of 'Poor'. • Watercourse encroachment has been added – recognises when structures will impact river morphology and ecological mobility. • Riparian encroachment has been changed to Minor, Moderate and Major and is now also included in baseline. • A greater length of river can now be enhanced to enable calculations for meandering.
Condition assessment criteria	3 categories; poor, moderate and good. Three condition criteria per habitat, and a "number of passes" system. e.g. if a habitat passes 3/3 = good, 2/3 = moderate, 1 or 0/3 = poor.	6 categories: N/A, poor, fairly poor, moderate, fairly good, good. There are varying amounts of condition criteria depending on the habitat, e.g. woodland has 12 condition criteria. Some habitats have an "passes out of XX" system (for example, woodland), others do not (e.g. grassland).	6 categories: N/A, poor, fairly poor, moderate, fairly good, good. All habitats have a "number of passes" system.
Outputs	One output, linear habitats are entered as areas to give one output measured in biodiversity units.	Area based habitats, linear based; hedgerow and river measured in habitat, hedgerow and river units.	Area based habitats, linear based; hedgerow and river measured in habitat, hedgerow and river units.

[5] https://modularriversurvey.org/

Topic	Highways England Metric	Metric 2.0	Metric 3.0
Hedgerows	All hedgerows are of high distinctiveness	Hedgerows can be of different categories of distinctiveness.	Hedgerows can be of different categories of distinctiveness and some categories of hedgerows have different distinctiveness score from Metric 2.0 such as native hedgerow with trees (from medium to high) and native species rich hedgerow with trees – now high.

Appendix to Q.1.7.1.1

COMPLIANCE WITH ADVICE NOTE 15

Advice Note 15 reference	Guidance	Compliance
Draft DCO		
2.1/ 2.4	A DCO must be made in the form of a validated Statutory Instrument (SI). SIs need to conform to a template which contains essential formatting for SIs. All copies of the draft DCO submitted to the Planning Inspectorate (including the Applicant's final draft DCO submitted towards the end of the Examination) must have been cleared through the validation process and be accompanied by a copy of the Validation Success email which evidences that the draft DCO is error free and on the correct version of SI template. Should draft DCOs be submitted with errors or without a successful validation email, applicants will be asked to resolve the errors and resubmit with a Validation Success email.	Complied. The draft development consent order (**dDCO**) **[APP-025]** is in the form of a validated SI. The Order Validation Confirmation email was submitted with the application and can be found with document reference **[APP-026]** in the Examination Library. The Applicant will continue to submit all copies of the dDCO (including the Applicant's final dDCO submitted towards the end of the Examination) through the validation process, and accompany all copies of the submitted dDCOs with a copy of the Validation Success email.
3.2	Where Deemed Marine Licences or other deemed consents or licences are included within a draft DCO, they must also follow the statutory drafting conventions for SIs. However, note that they are also self-contained licences and need to not be dependent on definitions in the body of the draft DCO.	Complied. No Deemed Marine Licences or other deemed consents or licences are included within the dDCO.

Advice Note 15 reference	Guidance	Compliance
5.1	References to Articles in the draft DCO or sections of Acts should include the heading of the provision on the first occasion that the reference appears in each Article or each paragraph of a Schedule.	Complied. References to Articles include the heading of the provision on the first occasion that the reference appears in each Article or each paragraph of a Schedule.
6.1	Definitions should be applied consistently throughout the draft DCO and should be in lower case.	Complied. Definitions are applied consistently throughout the dDCO and are in lower case.
6.2	Where there is more than one relevant planning authority (or other authority), this should be made clear in the definitions.	Complied. The definitions make a clear distinction between the various relevant planning authorities. For example, separate definitions are provided for "the relevant local highway authority"; "relevant planning authority"; "street authority"; and "traffic authority".
7.1	There should be clear footnotes provided for all Acts, SIs, European Union or other international legislation, or external documents referenced in a draft DCO, which must conform to the guidance on footnotes in SI practice (for legislation, the footnote should identify relevant amendments to specific provisions). This practice should apply throughout the draft DCO and its Schedules. This includes any draft Deemed Marine Licence because these also form part of an SI and must therefore meet SI standards, as mentioned above.	Complied. Clear footnotes are provided for all Acts, SIs, European Union or other international legislation, or external documents referenced in the dDCO and its Schedules.

Advice Note 15 reference	Guidance	Compliance
8.1	Schedules in DCOs must be given effect by an operative Article in the main body of the DCO. This may be by an express provision that the Schedule is to have effect or by clear implication (such as where the Article which grants development consent does so by reference to the Schedule which describes the Authorised Development). The Schedule should also include a shoulder reference to that operative Article, and such references should either be the first Article that mentions the Schedule, or all the Articles that mention the Schedule. A consistent approach should be adopted throughout the DCO.	Complied. Each Schedule in the dDCO makes reference to the operative Article(s) which mention the Schedule.
8.2	Schedules should be numbered according to the order they are mentioned in the substantive Articles in the draft DCO.	Complied. Schedules are numbered according to the order they are mentioned in the substantive Articles in the dDCO.
11.2	Plans and other documents which are required to be certified such as the Land Plans and Works Plans should be specifically listed in the relevant Article. Applicants should set out the titles and numbers of such documents, either in the certification Article or, if there are a large number of documents, in a separate Schedule or Schedules to the DCO.	Complied. Article 52 (*Certification of documents*) of the dDCO makes reference to Schedule 10 of the dDCO. Schedule 10 of the dDCO lists documents which are required to be certified, providing their name and reference number.
12.1	Draft DCOs must include a preamble, briefly setting out details of the submission, examination and determination of the application, citing relevant statutory provisions.	Complied. A preamble is provided in the dDCO between the Contents and Part 1. This outlines the process from submission to determination, citing relevant statutory provisions.
12.2	Draft DCOs must also, after the schedule, include a brief explanatory note, explaining the purpose of the DCO, and what it would permit the applicant to do if consented.	Complied. An explanatory note is provided after the Schedules to the dDCO explaining the purpose

Advice Note 15 reference	Guidance	Compliance
		of the Order, and what it would permit the Applicant to do if consented.
17.1/ Good practice point 1	If a Requirement imposes an obligation on the Applicant to seek approval of final details in a scheme, the Requirement should not be drafted in a way which allows the discharging authority to dispense with the need for a scheme altogether. Neither should it enable the discharging authority to vary the scheme in writing such that the scheme then departs from the principles fixed by the application.	Complied. All the relevant details are secured by Requirements with clear and measurable enforcement triggers – for instance, prior to commencement of part of the authorised development the Second Iteration EMP in relation to that part will need to have been submitted to and approved in writing by the Secretary of State, following consultation with the relevant planning authority and the relevant local highway authority. It is appropriate to reserve approval to this stage given that final details will not be known until the completion of detail design. Notwithstanding this, outline, or in-principle, plans have been included with the Application and the final details must accord with the relevant outline plan. In some instances it may be necessary to vary certain elements of an outline document with the approval of the relevant discharging authority. Flexibility is considered necessary in some circumstances – but only in so far as the amendments are in line with the assessments in the Environmental Statement (i.e. the principles fixed by the Application).
18.1/ Good practice point 2	Applicants should take care to ensure that the definition of maintain (if included in the draft DCO) does not seek to authorise activities which may generate	Complied.

Advice Note 15 reference	Guidance	Compliance
	significant effects beyond those assessed in relevant environmental information, notably the ES.	The definition of "maintain" in the dDCO includes the wording: "*provided such works do not give rise to any materially new or materially different environmental effects to those identified in the environmental statement*". This ensures that all activities authorised will not generate significant effects beyond those assessed.
19.1	Requirements should generally be drafted to identify the relevant planning authority or authorities by name. This could be made clear in the definitions, for example when defining the 'relevant planning authority'.	Complied. Given the number of local planning authorities affected by the Scheme and how each may be relevant to a requirement the dDCO includes a definition in Article 2 (Interpretation) of 'relevant planning authority' to mean "…the planning authority for the land to which the provision relates". This definition ensures that the 'relevant planning authority' can be identified for the purposes of the dDCO.

Advice Note 15 reference	Guidance	Compliance
19.2/ Good practice point 3	It is recommended that a mechanism for dealing with any disagreement between the Applicant and the discharging authority is defined and incorporated in a draft DCO Schedule. For example, including arrangements for when the discharging authority refuse an application made pursuant to a DCO Requirement, or approve it subject to conditions or fail to issue a decision within a prescribed period. The mechanism could also address the fees payable for discharging the Requirements.	Complied. Part 2 of Schedule 2 to the dDCO outlines the procedure for discharge of Requirements. As explained in paragraph 5.1.52 of the Explanatory Memorandum **[APP-028]**, this sets out clear time limits for decisions to be made and makes provision for circumstances where the Secretary of State requires further information to be provided in relation to an application for the discharge of a Requirement. An arbitration mechanism is included at Article 54 (Arbitration) of the dDCO.
22.1/ Good practice point 6	Hedgerows affected by the Proposed Development should be identified in a Schedule to and on a plan accompanying the draft DCO. The Schedule and plan could also helpfully identify those hedgerows that are 'important' hedgerows. This would enable parties such as the relevant planning authority to make submissions on the appropriateness of including such provisions, and the ExA to consider these. The draft DCO should also include a relevant Schedule and plan identifying the trees likely to be affected that are protected by TPOs and/ or are otherwise protected.	Complied. Schedule 8 (Hedgerows and trees), part 1 of the dDCO lists the hedgerows affected by the Scheme and makes reference to the habitats plan, which has been submitted with the application. The habitats plan can be found at Figure 1 of Appendix 8.3 of the Environmental Statement **[APP-190]**. As there are currently no trees subject to a TPO it is not necessary to include a plan within the dDCO.

Advice Note 15 reference	Guidance	Compliance
23.4/ Good practice point 7	Where an applicant is seeking powers in the DCO to acquire land compulsorily, the drafting of the Article containing the powers should make it clear whether or not the Applicant is also seeking a power to clear the title of the land of all private rights. The Applicant should consider whether the Article should be subject to a power under a separate Article which would allow the Applicant to exclude a particular private right from the blanket extinguishment power. It is suggested that a procedure is set out in the relevant Article such as the giving of notice or reaching agreement with the person who benefits from the right. This would ensure that only those rights which it is essential to extinguish are dealt with in this way. Any private rights, not just private rights of way, could be dealt with in this way. This Article could also give the Applicant a power to extinguish all private rights over land it already owns and which is required for the purposes of the development. Again, this power could be subject to the giving of notice or agreement.	Complied. Article 30(1) (Private rights over land) of the dDCO makes clear that power to clear the title of all private rights over land subject to compulsory acquisition is sought. Article 30(2) of the dDCO makes clear that power to clear the title of those private rights which are incompatible with rights to be compulsorily acquired or restrictive covenants to be imposed under the dDCO over land subject to compulsory acquisition of rights or the imposition of restrictive covenants is sought. Article 30(3) makes clear that power to clear the title of all private rights over land owned by the Applicant within the Order limits, when any material operation comprised in the authorised development interferes with or breaches those rights is sought. Article 30(4) of the dDCO makes clear that power is sought to suspend all private rights over land which the Applicant takes temporary possession of for as long as the Applicant remains in temporary possession of that land. Provision is provided at Article 30(7) to allow the Applicant to exclude a particular private right from the blanket extinguishment power.

Advice Note 15 reference	Guidance	Compliance
Good practice point 8	The changes made to Compulsory Acquisition legislation by the Housing and Planning Act 2016 has necessitated amendments to the Compulsory Acquisition provisions in DCOs. The Silvertown Tunnel Order 2018 provides an example of updated drafting which takes account of these changes, however applicants should be aware that these could be subject to further refinements and may vary depending on a department's drafting preferences.	Complied. Articles 35 (Modification of Part 1 of the 1965 Act) and 36 (Application of the 1981 Act) of the dDCO have been amended accordingly.
24.1-24.3/ Good practice point 9	Applicants should provide justification which is specific to each of the areas of land over which the power [to impose restrictive covenants] is being sought, rather than generic reasons and include a clear indication of the sorts of restrictions which would be imposed and wherever possible the power should extend only to the particular type of Restrictive Covenant required. DCO provisions seeking to impose Restrictive Covenants should not be broadly drafted and should identify the land to which they relate and the nature of the Restrictive Covenant.	Complied. The restrictive covenants sought are detailed in Schedule 5 (Land in which only new rights and restrictive covenants etc. may be provided) of the dDCO, together with the individual plots against which they are sought and the justification. .
25.2/ Good practice point 10	The power to apply, modify or exclude an existing statutory provision should be set out in an Article in the main body of the draft DCO. Those provisions that are proposed to be applied, modified or excluded by a DCO should be clearly identified, and, if extensive, identified in a Schedule or Schedules.	Complied. The express disapplication of legislative provisions is outlined in Article 3 (Disapplication of legislative provisions) of the dDCO. This Article 3 is explained further in paragraphs 4.1.13 to 4.1.30 of the Explanatory Memorandum.

Advice Note 15 reference	Guidance	Compliance
Explanatory Memorandum		
1.2	A thorough justification should be provided in the Explanatory Memorandum for every Article and Requirement, explaining why the inclusion of the power is appropriate in the specific case. The extent of justification should be proportionate to the degree of novelty and/ or controversy in relation to the inclusion of that particular power.	Complied. Sections 4 and 5 of the Explanatory Memorandum outline justification for each Article and Requirement, together with an explanation.
1.4	For each provision, the ExA is likely to want to be satisfied about certain matters, such as: a) The source of the provision (whether it be a previous made DCO or Transport and Works Act Order, or a novel provision). b) The section/ Schedule of the PA2008 under which it is made. c) Why it is relevant to the proposed development d) Why the Applicant considers it to be important / essential to the delivery of the proposed development.	Complied. a) the source of the provision is outlined in the text at Sections 4 and 5 of the Explanatory Memorandum for each Article. For example, paragraph 4.1.46 explains that "*Article 13 was not included in the model provisions, but has been included in all Highways England orders made to date, including the A303 Stonehenge Order (article 9) and the A14 Order (article 11).*" b) where relevant this is explained – for example, paragraph 4.1.203 of the Explanatory Memorandum explains that Article 57 "*reflects the provisions of section 135 of the PA 2008*". c) this is outlined in the text at Sections 4 and 5 of the Explanatory Memorandum. Background and purpose of the Order are also outlined in Section 2. d) this is outlined in the text at Sections 4 and 5 of the Explanatory Memorandum. Background and purpose of the Order are also outlined in Section 2.

Advice Note 15 reference	Guidance	Compliance
1.5	If a draft DCO includes wording derived from other made DCOs, this should be explained in the Explanatory Memorandum. The Explanatory Memorandum should explain why that particular wording is relevant to the proposed draft DCO, for example detailing what is factually similar for both the relevant consented NSIP and the Proposed Development. The ExA and Secretary of State will need to understand why it is appropriate for the scheme applied for. Any divergence in wording from the consented DCO drafting should also be explained.	Complied. Where relevant, this is explained in Section 4 of the Explanatory Memorandum – for example, paragraph 4.1.71 explains that while Article 17 (Temporary alteration, diversion, prohibition and restriction of the use of streets) "*has been included in previous development consent orders for highway schemes, for example on the M20 Junction 10a Order (article 14) and the A14 Order (article 14), express reference to "temporary stopping up" has been removed. The drafting has been amended so that it is clear that the highway status of the land will remain during the temporary interference of use and any subsoil rights will not be impacted during the carrying out of the works*."
1.6	Where applicants are seeking to include specific wording or apply a particular approach from a different statutory regime in a draft DCO, the reasons for doing so and the relevance of this to the application should also be made clear in the Explanatory Memorandum.	Complied. Whilst the Applicant has cited in the Explanatory Memorandum Transport and Works Act Orders which articles contained in the dDCO have found precedence from, these articles are also contained in consented DCOs. Both the Transport and Works Act Orders and the consented DCOs containing the relevant article are set out in Section 4 of the Explanatory Memorandum, for example paragraph 4.1.131 explains that Article 33 (Set off for enhancement in value of retained land)

Advice Note 15 reference	Guidance	Compliance
		"*has precedent in the Thames Tideway Order and TWAOs such as the London Underground (Northern Line Extension) Order 2014, the Midland Metro (Wolverhampton City Centre Extension) Order 2016 and the A303 Stonehenge Order*.
4.1	Where agreement on Protective Provisions has not been reached during the pre-application stage, applicants should, as a minimum, submit with their application the standard Protective Provisions for all relevant protected parties with any amendments that the Applicant is seeking annotated with full justification included within the Explanatory Memorandum.	Complied. Draft standard and, where possible and necessary, bespoke protective provisions have been included in Schedule 9 of the dDCO. Paragraphs 4.1.186-4.1.187 of the Explanatory Memorandum explain how Article 51 (Protective provisions) gives effect to Schedule 9 (Protective provisions) and the progress to date regarding negotiations with statutory undertakers.
6.1	Care should be taken to ensure that the definitions provided in draft DCOs do not conflict with any of the definitions provided in s235 of the PA2008 (where there is conflict, applicants should explain and provide justification in the Explanatory Memorandum).	Complied. Paragraphs 4.1.4 to 4.1.12 of the Explanatory Memorandum justify and explain the wording of definitions used.

Advice Note 15 reference	Guidance	Compliance
17.1	Any provisions in the draft DCO that allow for flexibility must be thoroughly justified within the Explanatory Memorandum.	Complied. Where relevant, explanation of this is included within Sections 4 and 5 of the Explanatory Memorandum. For example, paragraph 4.1.142 explains why flexibility was required in the drafting of Article 38 (Acquisition of subsoil or air-space only) "*to minimise so far as is possible the extent of interests to be acquired, with consequently less impact on affected landowners and lower payments of compensation, both of which are in the public interest*".
21.1/Good practice point 5	In some decisions the Secretary of State has removed definitions of 'commence' and/ or 'preliminary works' which could have allowed for a range of site preparation works (such as demolition or de-vegetation) to take place before the relevant planning authority had approved details of measures to protect the environment under the Requirements. If applicants consider that such an approach is appropriate in the particular circumstances of their proposed NSIP, they should provide reasons in the Explanatory Memorandum.	Complied. The definition of "commence" is discussed at paragraph 4.1.6(a) of the Explanatory Memorandum.

Advice Note 15 reference	Guidance	Compliance
25.3/ Good practice point 10	Under section 120(5)(a) of the PA2008 DCOs may apply, modify or exclude an existing statutory provision which relates to any matter for which provision may be made in the DCO. In this context, applicants should also be aware of the opportunities and restrictions under section 150 of the PA2008 on removing consent requirements. Applicants should provide in the Explanatory Memorandum a clear justification for the inclusion of such provisions in the particular circumstances.	Complied. The explanation provided within the Explanatory Memorandum alongside Article 3 (Disapplication of legislative provisions) of the dDCO provides explanation on this point. Paragraph 4.1.17 in particular relates to the opportunities and restrictions under section 150 of the PA 2008.

Appendix to Q.1.7.1.3

Q1.7.1.3 – Table of Authorities and Statutory Undertakers

Authority / undertaker	Draft Development Consent Order reference	Specific bodies
Highway authority or highways authority	Article 2 (*Interpretation)*	Highways England Company Limited (**Highways England**)
	Article 23(5) (*Authority to survey and investigate the land*)	Highways England
	Article 23(8) (*Authority to survey and investigate the land*)	Highways England
	Schedule 9, Part 3, (*Protective Provisions for the Protection of the Environment Agency and Drainage Authorities*), Paragraph 23(1)	Highways England Cambridgeshire County Council Central Bedfordshire Council Bedford Borough Council
	Schedule 9, Part 3, (*Protective Provisions for the Protection of the Environment Agency and Drainage Authorities*), Paragraph 26	Highways England Cambridgeshire County Council Central Bedfordshire Council Bedford Borough Council
Lead local flood authority	N/A	N/A
local highway authority ('relevant local highway authority' is used)	Article 2 (*Interpretation*)	Cambridgeshire County Council Central Bedfordshire Council Bedford Borough Council
	Article 13(1) (*Construction and maintenance of new, altered or diverted streets and other structures*)	Cambridgeshire County Council Central Bedfordshire Council Bedford Borough Council
	Article 13(2) (*Construction and maintenance of new, altered or diverted streets and other structures*)	Cambridgeshire County Council Central Bedfordshire Council Bedford Borough Council

Authority / undertaker	Draft Development Consent Order reference	Specific bodies
	Article 13(3) (*Construction and maintenance of new, altered or diverted streets and other structures*)	Cambridgeshire County Council Central Bedfordshire Council Bedford Borough Council
	Article 13(4)(b) (*Construction and maintenance of new, altered or diverted streets and other structures*)	Cambridgeshire County Council Central Bedfordshire Council Bedford Borough Council
	Article 13(5) (*Construction and maintenance of new, altered or diverted streets and other structures*)	Cambridgeshire County Council Central Bedfordshire Council Bedford Borough Council
	Article 13(8) (*Construction and maintenance of new, altered or diverted streets and other structures*)	Cambridgeshire County Council Central Bedfordshire Council Bedford Borough Council
	Article 13(9) (*Construction and maintenance of new, altered or diverted streets and other structures*)	Cambridgeshire County Council Central Bedfordshire Council Bedford Borough Council
	Article 14(11)(a) (*Classification of roads, etc.*)	Cambridgeshire County Council Central Bedfordshire Council Bedford Borough Council
	Article 23(5)(a) (*Authority to survey and investigate the land*)	Cambridgeshire County Council Central Bedfordshire Council Bedford Borough Council
	Article 23(8) and 8(a) (*Authority to survey and investigate the land*)	Cambridgeshire County Council Central Bedfordshire Council Bedford Borough Council
	Schedule 2 (*Requirements*), Paragraph 3(1) (Second Iteration EMP)	Cambridgeshire County Council Central Bedfordshire Council Bedford Borough Council

Authority / undertaker	Draft Development Consent Order reference	Specific bodies
	Schedule 2 (*Requirements*), Paragraph 4(1) (Third Iteration EMP)	Cambridgeshire County Council Central Bedfordshire Council Bedford Borough Council
	Schedule 2 (*Requirements*), Paragraph 11(1) (Traffic management)	Cambridgeshire County Council Central Bedfordshire Council Bedford Borough Council
Local planning authority ('relevant planning authority' is used)	Article 2 (*Interpretation*)	Central Bedfordshire Council Bedford Borough Council Huntingdonshire District Council South Cambridgeshire District Council
	Article 9(2) (*Limits of deviation*)	Central Bedfordshire Council Bedford Borough Council Huntingdonshire District Council South Cambridgeshire District Council
	Article 14(7) (*Classification of roads, etc*)	Central Bedfordshire Council Bedford Borough Council Huntingdonshire District Council South Cambridgeshire District Council
	Article 46(2)(c) (*Trees subject to tree preservation orders*)	There are currently no trees subject to tree preservation orders within the Order Limits.
	Article 56(4) (*Removal of human remains*)	Central Bedfordshire Council Bedford Borough Council Huntingdonshire District Council South Cambridgeshire District Council
	Article 56(11)(b) (*Removal of human remains*)	Central Bedfordshire Council Bedford Borough Council Huntingdonshire District Council South Cambridgeshire District Council

Authority / undertaker	Draft Development Consent Order reference	Specific bodies
	Article 59(1) (*The Cadent Diversion Works*)	Central Bedfordshire Council
	Schedule 2 (*Requirements)*, Paragraph 3(1) (*Second Iteration EMP*)	Central Bedfordshire Council Bedford Borough Council Huntingdonshire District Council South Cambridgeshire District Council
	Schedule 2 (*Requirements*), Paragraph, 4(1) (Third Iteration EMP)	Central Bedfordshire Council Bedford Borough Council Huntingdonshire District Council South Cambridgeshire District Council
	Schedule 2 (*Requirements*), Paragraph, 6(1) (Landscaping)	Central Bedfordshire Council Bedford Borough Council Huntingdonshire District Council South Cambridgeshire District Council
	Schedule 2 (*Requirements*), Paragraph 6(6) (Landscaping)	Central Bedfordshire Council Bedford Borough Council Huntingdonshire District Council South Cambridgeshire District Council
	Schedule 2 (*Requirements*), Paragraph 8(1) (Contaminated land and groundwater)	Central Bedfordshire Council Bedford Borough Council Huntingdonshire District Council South Cambridgeshire District Council
	Schedule 2 (*Requirements*), Paragraph 8(2) (Contaminated land and groundwater)	Central Bedfordshire Council Bedford Borough Council Huntingdonshire District Council South Cambridgeshire District Council
	Schedule 2 (*Requirements*), Paragraph 14(1) (Flood compensatory storage*)*	Central Bedfordshire Council Bedford Borough Council Huntingdonshire District Council South Cambridgeshire District Council
	Schedule 2 (*Requirements*), Paragraph 16(1) (Brook Cottages)	Bedford Borough Council

Authority / undertaker	Draft Development Consent Order reference	Specific bodies
	Schedule 2 (*Requirements*), Paragraph 18(1) (Noise Mitigation)	Central Bedfordshire Council Bedford Borough Council Huntingdonshire District Council South Cambridgeshire District Council
Street authority	Article 2 (*Interpretation*)	Bedford Borough Council Cambridgeshire County Council Central Bedfordshire Council
	Article 13(10) (*Construction and maintenance of new, altered or diverted streets and other structures*)	Bedford Borough Council Cambridgeshire County Council Central Bedfordshire Council
	Article 15(2) (*Power to alter layout etc. of streets*)	Bedford Borough Council Cambridgeshire County Council Central Bedfordshire Council
	Article 15(3)(a) / 15(3)(b) (*Power to alter layout etc. of streets*)	Bedford Borough Council Cambridgeshire County Council Central Bedfordshire Council
	Article 15(4) (*Power to alter layout etc. of streets*)	Bedford Borough Council Cambridgeshire County Council Central Bedfordshire Council
	Article 15(5) (*Power to alter layout etc. of streets*)	Bedford Borough Council Cambridgeshire County Council Central Bedfordshire Council
	Article 17(4) *(Temporary alteration, diversion, prohibition and restriction of the use streets)*	Bedford Borough Council Cambridgeshire County Council Central Bedfordshire Council
	Article 17(6) (*Temporary alteration, diversion, prohibition and restriction of the use streets)*	Bedford Borough Council Cambridgeshire County Council Central Bedfordshire Council

Authority / undertaker	Draft Development Consent Order reference	Specific bodies
	Article 18(2)(a) / 18(2)(b) *(Permanent stopping up and restriction of use of streets and private means of access)*	Bedford Borough Council Cambridgeshire County Council Central Bedfordshire Council
	Article 23(5)(b) (*Authority to survey and investigate the land*)	Bedford Borough Council, Cambridge County Council, Central Bedfordshire Council
	Article 23(8) / 23(8)(b) (*Authority to survey and investigate the land*)	Bedford Borough Council, Cambridge County Council, Central Bedfordshire Council
Traffic authority	Article 2 (*Interpretation*)	Bedford Borough Council Cambridgeshire County Council Central Bedfordshire Council
	Article 55(1) (*Traffic regulations*)	Bedford Borough Council Cambridgeshire County Council Central Bedfordshire Council
	Article 55(2) (*Traffic regulations*)	Bedford Borough Council Cambridgeshire County Council Central Bedfordshire Council
	Article 55(4) (*Traffic regulations*)	Bedford Borough Council Cambridgeshire County Council Central Bedfordshire Council
	Article 55(5)(a)(ii) (*Traffic regulations*)	Bedford Borough Council Cambridgeshire County Council Central Bedfordshire Council
	Article 55(5)(b) (*Traffic regulations*)	Bedford Borough Council Cambridgeshire County Council Central Bedfordshire Council

Authority / undertaker	Draft Development Consent Order reference	Specific bodies
	Article 55(6)(a)(i) (*Traffic regulations*)	Bedford Borough Council Cambridgeshire County Council Central Bedfordshire Council
	Article 55(11) (*Traffic regulations*)	Bedford Borough Council Cambridgeshire County Council Central Bedfordshire Council
Local authority	Article 6(3) (*Application of the 1990 Act*)	Cambridgeshire County Council Central Bedfordshire Council Bedford Borough Council Huntingdonshire District Council South Cambridgeshire District Council
	Article 20(2)(b)(ii) (*Clearways, prohibitions and restrictions*)	Cambridgeshire County Council Central Bedfordshire Council Bedford Borough Council Huntingdonshire District Council South Cambridgeshire District Council
	Article 21(6)(a) (*Discharge of water)*	Cambridgeshire County Council Central Bedfordshire Council Bedford Borough Council Huntingdonshire District Council South Cambridgeshire District Council
	Article 50(1) (*Appeals relating to the Control of Pollution Act 1974*)	Cambridgeshire County Council Central Bedfordshire Council Bedford Borough Council Huntingdonshire District Council South Cambridgeshire District Council
	Article 50(2)(b) (*Appeals relating to the Control of Pollution Act 1974*)	Cambridgeshire County Council Central Bedfordshire Council Bedford Borough Council Huntingdonshire District Council South Cambridgeshire District Council

Authority / undertaker	Draft Development Consent Order reference	Specific bodies
	Article 50(2)(d) (*Appeals relating to the Control of Pollution Act 1974*)	Cambridgeshire County Council Central Bedfordshire Council Bedford Borough Council Huntingdonshire District Council South Cambridgeshire District Council
	Article 50(8)(b) (*Appeals relating to the Control of Pollution Act 1974*)	Cambridgeshire County Council Central Bedfordshire Council Bedford Borough Council Huntingdonshire District Council South Cambridgeshire District Council
	Article 50(12) (*Appeals relating to the Control of Pollution Act 1974*)	Cambridgeshire County Council Central Bedfordshire Council Bedford Borough Council Huntingdonshire District Council South Cambridgeshire District Council
	Article 55(6)(a)(ii) (*Traffic Regulation*)	Cambridgeshire County Council Central Bedfordshire Council Bedford Borough Council
	Schedule 2 (*Requirements*), Paragraph 12(b) (Detailed design)	Cambridgeshire County Council Central Bedfordshire Council Bedford Borough Council Huntingdonshire District Council South Cambridgeshire District Council
	Schedule 2 (*Requirements*), Paragraph 13(1) (Surface and foul water drainage)	Cambridgeshire County Council Central Bedfordshire Council Bedford Borough Council Huntingdonshire District Council South Cambridgeshire District Council
	Schedule 2, (*Requirements*) Paragraph 13(2) (Surface and foul water drainage)	Cambridgeshire County Council Central Bedfordshire Council Bedford Borough Council Huntingdonshire District Council

Authority / undertaker	Draft Development Consent Order reference	Specific bodies
		South Cambridgeshire District Council
	Schedule 2, (*Requirements*) Paragraph 17(1) (Highway lighting)	Cambridgeshire County Council Central Bedfordshire Council Bedford Borough Council Huntingdonshire District Council South Cambridgeshire District Council
	Schedule 2, (*Requirements*) Paragraph 19(2)(p) (*Construction hours*)	Cambridgeshire County Council Central Bedfordshire Council Bedford Borough Council Huntingdonshire District Council South Cambridgeshire District Council
Public authority	Article 36(3) (*Application of the 1981 Act*)	Highways England Company Limited
Acquiring authority	Schedule 6 (*Modification of compensation and compulsory purchase enactments for creation of new rights*), all references	Highways England Company Limited
Fire and rescue authority	Article 20(b)(i) (*Clearways, prohibitions and restrictions*)	Cambridgeshire Fire and Rescue Bedfordshire Fire and Rescue Service
Internal drainage board	Article 12(6)(a) (*Application of the 1991 Act)*	Bedfordshire & River Ivel IDB
Drainage authority	Schedule 9 (*Protective provisions*), Part 3 (*For the protection of the Environment Agency and Drainage Authorities*), all references	Environment Agency Beds and River Ivel IDB Cambridgeshire County Council Central Bedfordshire Council Bedford Borough Council

Authority / undertaker	Draft Development Consent Order reference	Specific bodies
Sewerage undertaker	Article 20(2)(b)(iii) (*Clearways, prohibitions and restrictions*)	Anglian Water Services Limited
	Article 21(6)(a) (*Discharge of water*)	Anglian Water Services Limited
	Article 44(1) (*Recovery of costs of new connections*)	Anglian Water Services Limited
	Article 44(4) (*Recovery of costs of new connections*)	Anglian Water Services Limited
	Schedule 9 (Protective Provisions), Part 1 (*For the protection of electricity, gas, water and sewage undertakers*), paragraph 2(d)	Anglian Water Services Limited
	Schedule 9 (Protective Provisions), Part 1 (*For the protection of electricity, gas, water and sewage undertakers*), paragraph 2(h)	Anglian Water Services Limited
Statutory undertaker	Article 2(1) (*Interpretation*)	Anglian Water Services Limited Bedford Borough Council Cadent Central Bedfordshire County Council Cambridgeshire Water / South Staffordshire Water PLC Eastern Power Networks PLC Environment Agency Exolum Pipeline System Ltd (formerly CLH Pipeline System Ltd) National Grid Electricity PLC National Grid Gas PLC Network Rail Infrastructure Limited Openreach Beds and River Ivel IDB UK Power Networks (Operations) Limited (UKPN) Virgin Media

Authority / undertaker	Draft Development Consent Order reference	Specific bodies
		Vodafone
	Article 2(3)(b) (*Interpretation*)	As above.
	Article 10(2) (*Benefit of Order*)	As above.
	Article 11(3) (*Consent to transfer benefit of Orde*r)	As above.
	Article 11(4) (*Consent to transfer benefit of Orde*r)	As above.
	Article 28(1) (*Compulsory acquisition of rights and imposition of restrictive covenants*)	As above.
	Article 28(2) (*Compulsory acquisition of rights and imposition of restrictive covenants*)	As above.
	Article 28(3) (*Compulsory acquisition of rights and imposition of restrictive covenants*)	As above.

Authority / undertaker	Draft Development Consent Order reference	Specific bodies
	Article 28(5)(a) / 28(5)(b) (*Compulsory acquisition of rights and imposition of restrictive covenants*)	As above.
	Article 39(5) (*Rights under or over streets)*	As above.
	Article 40(4)(d) (*Temporary use of land for carrying out the authorised development*)	As above.
	Article 42(1)(a) / 42(1)(b) (*Statutory undertakers)*	As above.
	Article 43(8) (*Apparatus and rights of statutory undertakers in stopped up streets*)	This is as defined in the model provisions. However, the Applicant will revisit this to ensure it is being used appropriately for the Scheme and will make any amendments considered necessary in the draft development consent order at Deadline 4.
	Article 56(17) (*Removal of human remains*)	Anglian Water Services Limited Bedford Borough Council Cadent Central Bedfordshire County Council Cambridgeshire Water / South Staffordshire Water PLC Eastern Power Networks PLC Environment Agency Exolum Pipeline System Ltd (formerly CLH Pipeline System Ltd) National Grid Electricity PLC National Grid Gas PLC Network Rail Infrastructure Limited Openreach

Authority / undertaker	Draft Development Consent Order reference	Specific bodies
		Beds and River Ivel IDB UK Power Networks (Operations) Limited (UKPN) Virgin Media Vodafone Highways England
	Schedule 1 Part 1 (Authorised development), paragraph (k)	Anglian Water Services Limited Bedford Borough Council Cadent Central Bedfordshire County Council Cambridgeshire Water / South Staffordshire Water PLC Eastern Power Networks PLC Environment Agency Exolum Pipeline System Ltd (formerly CLH Pipeline System Ltd) National Grid Electricity PLC National Grid Gas PLC Network Rail Infrastructure Limited Openreach Beds and River Ivel IDB UK Power Networks (Operations) Limited (UKPN) Virgin Media Vodafone
Crown authority (reference is made to the Crown, the Crown Estate Commissioners, and the Crown Estate)	Article 57 (Crown Rights)	Secretary of State for Transport The Secretary of State for Environment, Food and Rural Affairs The Queen's Most Excellent Majesty In Right Of Her Crown and Bona Vacantia c/o The Crown Estate Commissioners The Secretary of State for Environment, Food and Rural Affairs

Appendix to Q.1.7.3.21

Plot number (formatted for sorting)	(1) Location	(2) Plot Reference Number shown on land plans	(3) Purpose for which temporary possession may be taken	(4) Relevant part of the authorised development	(5) Permanent works/mitigation works (Yes or No)	(6) Detail of Works	(7) Status of landowner agreement
01/01l	Roxton	1/1l	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned A1 carriageway.	Work No. 21	Yes	Improvements to the A1	None, HE owner
01/02a	Roxton	1/2a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned Bedford Road	Work No. 4	Yes	Improvements to Bedford Road	None, HE owner
01/02b	Roxton	1/2b	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned Bedford Road	Work No. 4	Yes	Improvements to Bedford Road	None, HE owner
01/02c	Roxton	1/2c	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned Bedford Road	Work No. 4	Yes	Improvements to Bedford Road	None, HE owner
01/07f	Roxton	1/7f	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the combined Kelpie Marina access track and realigned A1 carriageway.	Work Nos. 7, 21	Yes	Improvements to the A1	None, unregistered, HE presumed
01/08a	Wyboston, Chawston and Colesden	1/8a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned Roxton Road access track	Work No. 3	No	-	Discussions proceeding with freeholder.
01/08f	Wyboston, Chawston and Colesden	1/8f	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned dual carriageway west of the Black Cat junction.	Work No. 1	No	-	Discussions proceeding with freeholder.
01/08g	Roxton	1/8g	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned dual carriageway west of the Black Cat junction and westbound on slip road from the junction.	Work No. 1	No	-	Discussions proceeding with freeholder.
01/08h	Roxton	1/8h	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned Bedford Road	Work No. 4	Yes	Improvements to Bedford Road	Discussions proceeding with freeholder.
01/08m	Wyboston, Chawston and Colesden	1/8m	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned Roxton Road access track	Work No. 3	No	-	Discussions proceeding with freeholder.
01/08o	Roxton	1/8o	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned Bedford Road	Work No. 4	Yes	Improvements to Bedford Road	Discussions proceeding with freeholder.
01/08q	Roxton	1/8q	Required to provide a temporary construction area. Required to provide temporary storage, laydown areas, access and working space for this construction area, the construction of the realigned Greenacres access track, the construction of the flood compensation area south east of the new Black Cat junction circulatory, and the quarry restoration works.	Work Nos. 16, 17	No	-	Discussions proceeding with freeholder.
01/09e	Roxton	1/9e	Required to provide a temporary construction area. Required to provide temporary storage, laydown areas, access and working space for this construction area, the construction of the realigned Greenacres access track.	Work Nos. 15, 17	No	-	Discussions proceeding with freeholder.
01/10c	Wyboston, Chawston and Colesden	1/10c	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned Roxton Road access track	Work No. 3	No	-	Discussions proceeding with freeholder.
01/10g	Roxton	1/10g	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the combined Kelpie Marina access track and A1 northbound offslip road to the new Black Cat junction circulatory.	Work Nos. 7, 21	No	-	Discussions proceeding with freeholder.
01/10i	Roxton	1/10i	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the combined Kelpie Marina access track and bridleway, as well as the flood compensation area to the west of the track.	Work Nos. 7, 11	No	-	Discussions proceeding with freeholder.

01/10l	Roxton	1/10l	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the combined Kelpie Marina access track and bridleway.	Work No. 7	No	-	Discussions proceeding with freeholder.
01/16e	Roxton	1/16e	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of a turn around area along School Lane.	-	No	-	Discussions proceeding with freeholder.
01/16h	Roxton	1/16h	Required to provide a temporary construction compound, including temporary storage, laydown areas, access and working space.	-	No	-	Discussions proceeding with freeholder.
01/19a	Wyboston, Chawston and Colesden	1/19a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned Roxton Road	Work No. 3	No	-	Meeting to be arranged
01/20a	Wyboston, Chawston and Colesden	1/20a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned Roxton Road	Work No. 3	No	-	Discussions proceeding with freeholder.
01/20b	Roxton	1/20b	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned Bedford Road	Work No. 4	Yes	Improvements to Bedford Road	Discussions proceeding with freeholder.
01/20c	Roxton	1/20c	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned Bedford Road	Work No. 4	Yes	Improvements to Bedford Road	Discussions proceeding with freeholder.
01/21c	Roxton	1/21c	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the combined Kelpie Marina access track and bridleway, as well as the flood compensation area to the west of the track.	Work Nos. 7, 11	No	-	Meeting rearranged, new date to be agreed
01/23b	Wyboston, Chawston and Colesden	1/23b	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of Roxton Road Link (south)	Work No. 18	No	-	No instruction
01/23g	Roxton	1/23g	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the attenuation basin and realigned Bedford Road, Black Cat Junction including slip roads	Work Nos. 4, 5	No	-	No instruction
01/23i	Roxton	1/23i	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the combined Kelpie Marina access track and the flood compensation area to the west of the track.	Work Nos. 7, 11	No	-	No instruction
01/23m	Roxton	1/23m	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned A1 carriageway, the realigned access track over Rockham Ditch at Greenacres, and flood compensation area south east of the new Black Cat junction circulatory.	Work Nos. 15, 21, 24	No	-	No instruction
01/32c	Wyboston, Chawston and Colesden	1/32c	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of Roxton Road Link (south)	Work No. 18	Yes	Construction of the property access	Discussions proceeding with freeholder.
01/33a	Wyboston, Chawston and Colesden	1/33a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of Roxton Road Link (south)	Work No. 18	Yes	Construction of the property access	Discussions proceeding with freeholder.
01/36b	Wyboston, Chawston and Colesden	1/36b	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the A1 Services link road and a construction area north east of the new Black Cat junction circulatory.	Work Nos. 22, 23	Yes	Construction of property access	No instruction
01/37b	Wyboston, Chawston and Colesden	1/37b	Required to provide a temporary construction area, including temporary storage, laydown areas, access and working space.	Work No. 23	No	-	No instruction
01/40a	Roxton	1/40a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the combined Kelpie Marina access track and realigned Bedford Road.	Work Nos. 4, 7a	Yes	Construction of field access	Discussions proceeding with freeholder.
01/42c	Roxton	1/42c	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned Greenacres access track and A1 southbound on slip road from the new Black Cat junction circulatory.	Work Nos. 15, 21	Yes	Construction of property access	No instruction

01/43d	Roxton	1/43d	Required to provide a temporary construction area, including temporary storage, laydown areas, access and working space for this construction area, the construction of the realigned Greenacres access track, the construction of the realigned access track over Rockham Ditch, and the construction of the flood compensation area south east of the new Black Cat junction circulatory.	Work Nos. 15, 17, 24	No	-	No instruction
01/46b	Roxton	1/46b	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the combined Kelpie Marina access track and bridleway.	Work No. 7	No	-	Meeting to be arranged
01/47a	Roxton	1/47a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the combined Kelpie Marina access track and bridleway.	Work No. 7	No	-	Recent respondent, meeting to be arranged
01/49a	Roxton	1/49a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned A1 carriageway.	Work No. 21	No	-	No instruction
01/49c	Roxton	1/49c	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the combined Kelpie Marina access track and realigned A1 carriageway.	Work Nos. 7, 21	No	-	No instruction
01/51a	Tempsford	1/51a	Required to provide temporary storage, laydown areas, access and working space to facilitate improvements to the A1.	Work No. 21	No	-	Recent respondent, meeting to be arranged
02/01a	Wyboston, Chawston and Colesden	2/1a	Required to facilitate improvements to the A1 and to provide temporary access and working space.	Work No. 21	Yes	Improvements to the A1 - relocation of bus stop	None, HE owner
02/01b	Wyboston, Chawston and Colesden	2/1b	Required to facilitate improvements to the A1 and to provide temporary access and working space.	Work No. 21	Yes	Improvements to the A1 - relocation of bus stop	None, HE owner
02/01c	Wyboston, Chawston and Colesden	2/1c	Required to provide temporary storage, laydown areas, access and working space to facilitate improvements to the A1 and the construction of the access road to The Lane.	Work Nos. 21, 36	Yes	Improvements to the A1	None, HE owner
02/01d	Wyboston, Chawston and Colesden	2/1d	Required to provide temporary storage, laydown areas, access and working space to facilitate improvements to the A1, the construction of the access road to The Lane, and the diversion of underground utilities.	Work Nos. 20, 21, 28, 36	Yes	Improvements to the A1 and construction of the access road to the Lane	None, HE owner
02/01e	Wyboston, Chawston and Colesden	2/1e	Required to provide temporary storage, laydown areas, access and working space to facilitate improvements to the A1, the construction of the access road to The Lane, and the diversion of underground utilities.	Work Nos. 20, 21, 28, 36	Yes	Improvements to the A1 and construction of the access road to the Lane	None, HE owner
02/01f	Wyboston, Chawston and Colesden	2/1f	Required to facilitate improvements to the A1 and to provide temporary access and working space.	Work No. 21	Yes	Improvements to the A1	None, HE owner
02/01g	Wyboston, Chawston and Colesden	2/1g	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned A1 carriageway	Work No. 21	Yes	Improvements to the A1	None, HE owner
02/01k	Wyboston, Chawston and Colesden	2/1k	Required to facilitate the construction of a highway gantry in the A1 southbound verge and to provide temporary access and working space.	-	Yes	Construction of a highway gantry	None, HE owner
02/02a	Wyboston, Chawston and Colesden	2/2a	Required to provide temporary access and working space to facilitate the construction of the realigned A1 carriageway and the diversion of an underground water utility.	Work Nos. 21, 31	Yes	Improvements to the A1	None, HE owner
02/03a	Wyboston, Chawston and Colesden	2/3a	Required to facilitate improvements to the A1 and to provide temporary access and working space.	Work No. 21	No	-	None, HE owner
02/03b	Wyboston, Chawston and Colesden	2/3b	Required to facilitate improvements to the A1 and to provide temporary access and working space.	Work No. 21	Yes	Improvements to the A1	None, HE owner
02/03d	Wyboston, Chawston and Colesden	2/3d	Required to facilitate improvements to the A1 and the construction of the realigned A1 carriageway and to provide temporary access and working space.	Work No. 21	Yes	Improvements to the A1	None, HE owner
02/03e	Wyboston, Chawston and Colesden	2/3e	Required to facilitate improvements to the A1 and the construction of the realigned A1 carriageway and to provide temporary access and working space for these works, as well as to provide temporary access and working space to facilitate the construction of the A1 Services link road and the access road to The Lane.	Work Nos. 21, 22, 36	Yes	Improvements to the A1, construction of the access to the Lane and the construction of the A1 Services Link	None, HE owner

02/04a	Wyboston, Chawston and Colesden	2/4a	Required to facilitate improvements to the A1 and to provide temporary access and working space.	Work No. 21	Yes	Improvements to the A1 - relocation of bus stop	No instruction
02/04b	Wyboston, Chawston and Colesden	2/4b	Required to facilitate the construction of the realigned section of The Lane and the diversion of underground utilities, including temporary access and working space for these works, as well as to provide temporary access and working space to facilitate the construction of Roxton Road link (north).	Work Nos. 20, 28, 29, 36	Yes	Construction of the Roxton Road link (north) and the realigned section of The Lane	No instruction
02/04c	Wyboston, Chawston and Colesden	2/4c	Required to provide temporary access and working space to facilitate the construction of the realigned A1 carriageway and the Nagshead Lane link.	Work Nos. 29, 31, 32	Yes	Improvements to Nagshead Lane to tie in the proposed Nagshead Lane link	No instruction
02/04d	Wyboston, Chawston and Colesden	2/4d	Required to provide temporary access and working space to facilitate the construction of Roxton Road link (north and south).	Work Nos. 18, 19, 20, 28, 29	Yes	Improvements to Chawston Lane to tie in the Roxton Road link (south and north)	No instruction
02/05a	Wyboston, Chawston and Colesden	2/5a	Required to facilitate improvements to the A1 and to provide temporary access and working space.	Work No. 21	No	-	No instruction
02/06a	Wyboston, Chawston and Colesden	2/6a	Required to facilitate improvements to the A1 and to provide temporary access and working space.	Work No. 21	Yes	Improvements to the A1 - relocation of bus stop	No instruction
02/07a	Wyboston, Chawston and Colesden	2/7a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of Roxton Road link (north) and the flood compensation area east of the link.	Work Nos. 29, 34	Yes	Construction of the flood compensation area	No instruction
02/08b	Wyboston, Chawston and Colesden	2/8b	Required to facilitate the decommissioning and removal of diverted utilities	Work No. 32	No	-	Discussions proceeding with freeholder.
02/08c	Wyboston, Chawston and Colesden	2/8c	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of Roxton Road link (north)	Work Nos. 29, 32	No	-	Discussions proceeding with freeholder.
02/08f	Wyboston, Chawston and Colesden	2/8f	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of Roxton Road link (north)	Work Nos. 29, 35	No	-	Discussions proceeding with freeholder.
02/09a	Wyboston, Chawston and Colesden	2/9a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of Roxton Road link (north) and the flood compensation area east of the link.	Work Nos. 29, 34	Yes	Construction of the flood compensation area	No longer own property
02/10a	Wyboston, Chawston and Colesden	2/10a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of Roxton Road link (north) and the flood compensation area east of the link.	Work Nos. 29, 34	No	-	No longer own property
02/11a	Wyboston, Chawston and Colesden	2/11a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of Roxton Road link (north), the flood compensation area east of the link, and the attenuation basin east of both Roxton Road link (north) and the Nagshead Lane link.	Work Nos. 29, 33, 34	Yes	Construction of the property access and drainage ditch to the east of Roxton Road link	Discussions proceeding with freeholder.
02/11b	Wyboston, Chawston and Colesden	2/11b	Required to facilitate the decommissioning and removal of diverted utilities	Work No. 32	No	-	Discussions proceeding with freeholder.
02/13a	Wyboston, Chawston and Colesden	2/13a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the access road to The Lane.	Work No. 36	No	-	Meeting to be arranged
02/14a	Wyboston, Chawston and Colesden	2/14a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the access road to The Lane.	Work No. 36	Yes	Construction of the access to The Lane	Discussions proceeding with freeholder.
02/15b	Wyboston, Chawston and Colesden	2/15b	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the access road to The Lane.	Work No. 36	Yes	Construction of the access to The Lane	Discussions proceeding with freeholder.
02/16a	Wyboston, Chawston and Colesden	2/16a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the access road to The Lane.	Work No. 36	No	-	Not interested in agreement
02/18c	Wyboston, Chawston and Colesden	2/18c	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of Roxton Road link (north)	Work No. 29	No	-	No instruction
02/19a	Wyboston, Chawston and Colesden	2/19a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of Roxton Road link (north), the Nagshead Lane link and the attenuation basin east of these links.	Work Nos. 29, 33	No	-	Discussions proceeding with freeholder.

02/19c	Wyboston, Chawston and Colesden	2/19c	Required to facilitate the decommissioning and removal of diverted utilities	Work No. 32	No	-	Discussions proceeding with freeholder.
02/19d	Wyboston, Chawston and Colesden	2/19d	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned A1 carriageway and the Nagshead Lane link.	Work Nos. 21, 29	No	-	Discussions proceeding with freeholder.
02/21a	Wyboston, Chawston and Colesden	2/21a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of Roxton Road link (north)	Work No. 29	No	-	No instruction
02/22a	Wyboston, Chawston and Colesden	2/22a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of Roxton Road link (north)	Work No. 29	No	-	No instruction
02/23a	Wyboston, Chawston and Colesden	2/23a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned A1 carriageway	Work No. 21	No	-	Meeting to be arranged
02/24b	Wyboston, Chawston and Colesden	2/24b	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of Roxton Road link (south)	Work No. 18	No	-	Meetings arranged for 3/8/21 and 17/8/21 but no response or attendance
02/24c	Wyboston, Chawston and Colesden	2/24c	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the flood compensation area west of Roxton Road link (south)	Work No. 26	No	-	Meetings arranged for 3/8/21 and 17/8/21 but no response or attendance
02/25a	Wyboston, Chawston and Colesden	2/25a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of Roxton Road link (south)	Work No. 18	No	-	No instruction
02/26a	Wyboston, Chawston and Colesden	2/26a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of Roxton Road link (south) and the associated culvert across South Brook.	Work Nos. 18, 25	No	-	Discussions proceeding with freeholder.
03/01a	Wyboston, Chawston and Colesden	3/1a	Required to provide a temporary construction area, including temporary storage, laydown areas, access and working space.	Work No. 23	No	-	No instruction
03/01c	Wyboston, Chawston and Colesden	3/1c	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the River Great Ouse viaduct and the access track extending from the A1 Services link road.	Work Nos. 22, 39	No	-	No instruction
03/02a	Wyboston, Chawston and Colesden	3/2a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the River Great Ouse viaduct and the access track extending from the A1 Services link road.	Work Nos. 22, 39	No	-	No instruction
03/03c	Roxton	3/3c	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the flood compensation area south east of the new Black Cat junction circulatory.	Work No. 24	No	-	Discussions proceeding with freeholder.
03/07a	Roxton	3/7a	Required to provide temporary access and working space to facilitate the construction of the River Great Ouse viaduct.	Work No. 39	No	-	Meeting to be arranged
03/08a	Tempsford	3/8a	Required to provide temporary access and working space to facilitate the construction of the River Great Ouse viaduct.	Work No. 39	No	-	Recent respondent, meeting to be arranged
03/09a	Wyboston, Chawston and Colesden	3/9a	Required to provide temporary access and working space to facilitate the construction of the River Great Ouse viaduct.	Work No. 39	No	-	No instruction
03/10a	Tempsford	3/10a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned Barford Road.	Work No. 43	Yes	Construction of the field access	Recent respondent, meeting to be arranged
03/10b	Tempsford	3/10b	Required to provide temporary access and working space to facilitate the construction of the realigned Barford Road.	Work No. 43	No	-	Recent respondent, meeting to be arranged
03/10f	Tempsford	3/10f	Required to provide temporary access and working space to facilitate the construction of the River Great Ouse viaduct.	Work No. 39	No	-	Recent respondent, meeting to be arranged
03/10g	Tempsford	3/10g	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned Barford Road.	Work No. 43	Yes	Construction of the field access	Recent respondent, meeting to be arranged

03/10h	Tempsford	3/10h	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned Barford Road.	Work Nos. 43, 44	Yes	Construction of the field access	Recent respondent, meeting to be arranged
03/10i	Tempsford	3/10i	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned Barford Road.	Work Nos. 43, 44, 45	Yes	Construction of the drainage ditch	Recent respondent, meeting to be arranged
03/10l	Tempsford	3/10l	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned Barford Road, the attenuation basin and flood compensation areas east of this (north of the dual carriageway), and the dual carriageway.	Work Nos. 40, 43, 46, 48	No	-	Recent respondent, meeting to be arranged
03/10m	Tempsford	3/10m	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned Barford Road, the flood compensation area east of this (south of the dual carriageway), and the dual carriageway.	Work Nos. 40, 43, 48	Yes	Construction of a drainage ditch	Recent respondent, meeting to be arranged
03/10n	Tempsford	3/10n	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway.	Work No. 40	No	-	Recent respondent, meeting to be arranged
03/11b	Tempsford	3/11b	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned Barford Road.	Work No. 43	No	-	No instruction
03/12a	Little Barford	3/12a	Required to provide temporary access and working space to facilitate the construction of the realigned Barford Road.	Work No. 43	Yes	Improvements to Barford Road	No instruction
03/13a	Tempsford	3/13a	Required to provide temporary access and working space to facilitate the construction of the realigned Barford Road.	Work No. 43	Yes	Improvements to Barford Road	No instruction
03/13b	Tempsford	3/13b	Required to provide temporary access and working space to facilitate the construction of the realigned Barford Road.	Work Nos. 43, 44	Yes	Improvements to Barford Road	No instruction
03/17a	Tempsford	3/17a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned Barford Road, and the attenuation basin east of this.	Work Nos. 43, 44, 46	Yes	Construction of a drainage ditch	Meeting to be arranged
04/01a	Tempsford	4/1a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway.	Work No. 40	No	-	Recent respondent, meeting to be arranged
04/01c	Tempsford	4/1c	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway and the East Coast Main Line bridge.	Work Nos. 40, 50	No	-	Recent respondent, meeting to be arranged
04/01f	Tempsford	4/1f	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway.	Work No. 40	No	-	Recent respondent, meeting to be arranged
04/01l	Tempsford	4/1l	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway.	Work No. 40	No	-	Recent respondent, meeting to be arranged
04/01o	Tempsford	4/1o	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the attenuation basin east of the East Coast Main Line bridge, as well as the access tracks from the dual carriageway.	Work Nos. 40, 50, 53	Yes	Construction of the field access track and drainage ditch	Recent respondent, meeting to be arranged
04/01p	Tempsford	4/1p	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the attenuation basin east of the East Coast Main Line bridge, as well as the access tracks from the dual carriageway.	Work Nos. 40, 50, 53	Yes	Construction of the field access track	Recent respondent, meeting to be arranged
04/01q	Tempsford	4/1q	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the attenuation basin east of the East Coast Main Line bridge, as well as the access tracks from the dual carriageway.	Work Nos. 40, 50, 53	Yes	Construction of the field access track and drainage ditch	Recent respondent, meeting to be arranged

04/01r	Tempsford	4/1r	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway, the attenuation basin east of the East Coast Main Line bridge, as well as the access tracks from the dual carriageway.	Work Nos. 40, 50, 53, 54	No	-	Recent respondent, meeting to be arranged
04/01s	Tempsford	4/1s	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the access track from the dual carriageway.	Work No. 50	No	-	Recent respondent, meeting to be arranged
04/02a	Tempsford	4/2a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the East Coast Main Line bridge.	Work No. 50	Yes	Construction of boundary treatment	No instruction
04/02b	Tempsford	4/2b	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the East Coast Main Line bridge.	Work No. 50	Yes	Construction of boundary treatment	No instruction
04/02d	Tempsford	4/2d	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the East Coast Main Line bridge.	Work No. 50	Yes	Construction of boundary treatment	No instruction
04/02e	Tempsford	4/2e	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the East Coast Main Line bridge.	Work No. 50	Yes	Construction of boundary treatment	No instruction
04/02f	Tempsford	4/2f	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the East Coast Main Line bridge.	Work No. 50	Yes	Construction of boundary treatment	No instruction
04/02h	Tempsford	4/2h	Required to provide temporary access and working space to facilitate the construction of the East Coast Main Line bridge.	Work No. 50	No	-	No instruction
04/02i	Tempsford	4/2i	Required to provide temporary access and working space to facilitate the construction of the East Coast Main Line bridge.	Work No. 50	No	-	No instruction
04/03a	Little Barford	4/3a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway.	Work Nos. 40, 54	No	-	Not interested in agreement
04/03c	Little Barford	4/3c	Required to provide earthworks, temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway and Top Farm access track.	Work Nos. 54, 55	Yes	Regrading of the land to facilitate the new dual carriageway construction	Not interested in agreement
05/01b	Little Barford	5/1b	Required to provide a temporary construction area, including temporary storage, laydown areas, access and working space to facilitate the construction of the Top Farm accommodate bridge and access tracks, as well as the dual carriageway.	Work Nos. 54, 55	Yes	Regrading of the land to facilitate the new dual carriageway construction. Construction of the field access track	Not interested in agreement
05/01d	Little Barford	5/1d	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the Top Farm accommodate bridge and access tracks, as well as the dual carriageway.	Work Nos. 54, 55, 56	Yes	Construction of the field access track	Not interested in agreement
05/01e	Little Barford	5/1e	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the Top Farm accommodate bridge and access tracks, as well as the dual carriageway.	Work Nos. 54, 55, 56	Yes	Regrading of the land to facilitate the new dual carriageway construction	Not interested in agreement
05/01g	Little Barford	5/1g	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway.	Work Nos. 54, 57	Yes	Regrading of the land to facilitate the new dual carriageway construction	Not interested in agreement

05/02a	Abbotsley; Little Barford	5/2a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway, the flood compensation area between this and Potton Road, and a field access track from Potton Road.	Work Nos. 54, 57, 59	Yes	Construction of the field access track	No instruction
05/02c	Abbotsley	5/2c	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway and the realigned Potton Road, as well as the flood compensation area between the dual carriageway and Potton Road.	Work Nos. 57, 59, 64	No	-	No instruction
05/02d	Abbotsley; Little Barford	5/2d	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway.	Work No. 57	No	-	No instruction
05/02h	Abbotsley	5/2h	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway.	Work No. 57	No	-	No instruction
05/02j	Abbotsley	5/2j	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned Potton Road.	Work No. 64	Yes	Construction of the property access	No instruction
05/03a	Abbotsley	5/3a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of a field access track from Potton Road.	-	Yes	Construction of the field access track	No instruction
05/03b	Abbotsley	5/3b	Required to facilitate the diversion of an underground water utility and to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned Potton Road.	Work Nos. 60, 64	Yes	Construction of the realigned Potton Road Installation of an underground water utility	No instruction
05/03c	Abbotsley	5/3c	Required to facilitate the diversion of underground power and electronic communications utilities, as well as the construction of the realigned Potton Road.	Work Nos. 63, 64, 65, 66	Yes	Construction of the realigned Potton Road Installation of underground power and electronic communications utilities	No instruction
05/05a	Abbotsley	5/5a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned Potton Road and the diversion of underground utilities.	Work Nos. 60, 61, 64	Yes	Installation of underground utilities	No instruction
05/06a	Abbotsley	5/6a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned Potton Road and the diversion of underground utilities.	Work Nos. 60, 61, 64	Yes	Installation of underground utilities	No instruction
05/08b	Abbotsley	5/8b	Required to facilitate the diversion of an underground power utility, as well as the construction of the realigned Potton Road.	Work Nos. 63, 64	Yes	Construction of the property access	Discussions proceeding with freeholder.
05/08c	Abbotsley	5/8c	Required to facilitate the diversion of underground power and electronic communications utilities, as well as the construction of the realigned Potton Road.	Work Nos. 63, 64, 65	Yes	Construction of the property access	Discussions proceeding with freeholder.
06/01a	Abbotsley; St Neots	6/1a	Required to provide temporary storage, laydown areas, access and working space to facilitate the de-trunking of the existing A428 carriageway.	-	No	-	None, HE owner
06/02a	Abbotsley	6/2a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned B1046.	Work No. 68	No	-	No instruction
06/02c	Abbotsley	6/2c	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned B1046.	Work No. 68	No	-	No instruction
06/02e	Abbotsley	6/2e	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned B1046, including the tie-in to the existing Potton Road being stopped up and retained as a private access.	Work Nos. 64, 68	No	-	No instruction

06/02g	Part of the agricultural field and shrubbery; north of Potton Road and east of Rectory Farm Cottages, Eynesbury Hardwicke, St Neots.	6/2g	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway and the realigned B1046.	Work Nos. 57, 68	No	-	No instruction
06/02i	Part of the agricultural field, trees, shrubbery and ditches; east of Rectory Farm Cottage and south of Potton Road, Eynesbury Hardwicke, St Neots	6/2i	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway and the realigned Potton Road.	Work Nos. 57, 64	No	-	No instruction
06/02m	Part of the agricultural field; north of Parkers Farmhouse and east of Potton Road, St Neots	6/2m	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned Potton Road.	Work Nos. 64, 66	No	-	No instruction
06/02o	Part of the agricultural field; north-east of Eynesbury Warehousing and south of St Neots Road, B1046, Eynesbury Hardwicke, St Neots.	6/2o	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned B1046.	Work No. 68	No	-	No instruction
06/03a	Abbotsley	6/3a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned B1046.	Work No. 68	Yes	Improvements to the B1046	No instruction
06/08a	Abbotsley	6/8a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned B1046.	Work No. 68	No	-	Discussions proceeding with freeholder.
06/08c	Abbotsley	6/8c	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway and the realigned B1046, as well as the underpass and culvert at Hen Brook, including the stopping up of a section of Footpath 1/20 between the existing A428 and the new dual carriageway.	Work Nos. 57, 68, 72	Yes	Construction of the field access	Discussions proceeding with freeholder.
06/08f	Abbotsley	6/8f	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway, the realigned B1046, an attenuation basin and the flood compensation area north of the B1046, and the access track between the B1046 and the attenuation basins.	Work Nos. 57, 68, 70, 71	No	-	Discussions proceeding with freeholder.
06/08g	Abbotsley	6/8g	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway, the realigned B1046, the flood compensation area and an attenuation basin north of the B1046, and the access track between the B1046 and the attenuation basins, as well as the underpass and culvert at Hen Brook.	Work Nos. 57, 68, 71, 72, 73	Yes	Construction of a drainage ditch and field access	Discussions proceeding with freeholder.
06/09a	Abbotsley	6/9a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway and the access track between the B1046 and attenuation basins. Temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway.	Work Nos. 57, 68	No	-	Discussions proceeding with freeholder.
07/01a	Little Barford; St Neots; Wyboston, Chawston and Colesden	7/1a	Required to provide temporary storage, laydown areas, access and working space to facilitate the de-trunking of the existing A428 carriageway.	-	No	-	None, HE owner

07/01b	Little Barford; St Neots	7/1b	Required to provide temporary storage, laydown areas, access and working space to facilitate the de-trunking of the existing A428 carriageway.	-	No	-	None, HE owner
07/01c	Abbotsley; St Neots	7/1c	Required to provide temporary storage, laydown areas, access and working space to facilitate the de-trunking of the existing A428 carriageway.	-	No	-	None, HE owner
07/01d	Abbotsley; St Neots	7/1d	Required to provide temporary storage, laydown areas, access and working space to facilitate the introduction of the construction area north-west of the existing A428, between the B1046 and Hen Brook, as well as to facilitate the de-trunking of the existing A428 carriageway.	Work No. 74	No	-	None, HE owner
07/02a	St Neots	7/2a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned B1046.	Work No. 68	No	-	None, HE owner
07/02b	St Neots	7/2b	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned B1046.	Work No. 68	Yes	Improvements to the B1046	None, HE owner
07/02c	Abbotsley; St Neots	7/2c	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned B1046.	Work No. 68	Yes	Improvements to the B1046	None, HE owner
07/02d	Abbotsley	7/2d	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned B1046.	Work No. 68	Yes	Improvements to the B1046	None, HE owner
07/03a	Little Barford	7/3a	Required to provide temporary storage, laydown areas, access and working space to facilitate the de-trunking of the existing A428 carriageway.	-	No	-	None, HE owner
07/04a	Wyboston, Chawston and Colesden	7/4a	Required to provide temporary storage, laydown areas, access and working space to facilitate the de-trunking of the existing A428 carriageway.	-	No	-	No instruction
07/04b	Abbotsley; Little Barford; St Neots	7/4b	Required to provide temporary storage, laydown areas, access and working space to facilitate the de-trunking of the existing A428 carriageway.	-	No	-	No instruction
07/04c	Wyboston, Chawston and Colesden	7/4c	Required to provide temporary storage, laydown areas, access and working space to facilitate the de-trunking of the existing A428 carriageway.	-	No	-	No instruction
07/04d	Wyboston, Chawston and Colesden	7/4d	Required to provide temporary storage, laydown areas, access and working space to facilitate the de-trunking of the existing A428 carriageway.	-	No	-	No instruction
07/05a	St Neots	7/5a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned B1046 and the introduction of the construction area north-west of the existing A428, between the B1046 and Hen Brook.	Work Nos. 68, 74	Yes	Improvements to the B1046	No instruction
07/05b	Abbotsley	7/5b	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned B1046.	Work No. 68	Yes	Improvements to the B1046	No instruction
07/06a	St Neots	7/6a	Required to facilitate the introduction of the temporary construction area north-west of the existing A428, between the B1046 and Hen Brook.	Work No. 74	No	-	Discussions proceeding with freeholder.
08/01a	Abbotsley; St Neots	8/1a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the Cambridge Road Junction and the de-trunking of the existing A428 carriageway.	Work Nos. 80a	Yes	Construction of new link approach to the existing Cambridge Road roundabout	None, HE owner
08/02a	St Neots	8/2a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the Cambridge Road Junction and the de-trunking of the existing A428 carriageway.	Work Nos. 80a	No	-	None, HE owner
08/03a	Abbotsley	8/3a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the Cambridge Road Junction and the de-trunking of the existing A428 carriageway.	Work Nos. 80a	Yes	Construction of new link approach to the existing Cambridge Road roundabout	None, HE owner
08/04a	Abbotsley	8/4a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway.	Work No. 57	No	-	Discussions proceeding with freeholder.

08/05a	Abbotsley	8/5a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway, footbridge and realigned footpath.	Work Nos. 57, 77	No	-	Discussions proceeding with freeholder.
08/05c	Abbotsley	8/5c	Required to facilitate the construction of the dual carriageway, Cambridge Road Junction, footbridge and realigned footpath, including the regrading of earthworks as well as temporary storage, laydown areas, access and working space.	Work Nos. 57, 77, 80a	Yes	Regrading of the land to facilitate the new dual carriageway construction Creation of a linear belt of shrubs and trees south of the existing Cambridge Road roundabout	Discussions proceeding with freeholder.
08/05e	Abbotsley	8/5e	Required to facilitate the construction of the dual carriageway, footbridge and realigned footpath, including the regrading of earthworks as well as temporary storage, laydown areas, access and working space.	Work Nos. 57, 77	Yes	Regrading of the land to facilitate the new dual carriageway construction	Discussions proceeding with freeholder.
08/06a	St Neots	8/6a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the Cambridge Road Junction.	Work Nos. 80a	No	-	No instruction
08/06b	St Neots	8/6b	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the Cambridge Road Junction and the de-trunking of the existing A428 carriageway.	Work Nos. 80a	No	-	No instruction
08/07a	St Neots	8/7a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the Cambridge Road Junction and the de-trunking of the existing A428 carriageway.	Work Nos. 80a	No	-	No instruction
08/08a	Abbotsley	8/8a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the Cambridge Road Junction and the de-trunking of the existing A428 carriageway.	Work Nos. 80a	Yes	Construction of new link approach and new field access track to the existing Cambridge Road roundabout	Discussions proceeding with freeholder.
09/01b	St Neots	9/1b	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the Cambridge Road Junction.	Work Nos. 80a	No	-	None, HE owner
09/02b	Abbotsley	9/2b	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the Cambridge Road Junction, accommodation bridge and realigned access track, as well as the de-trunking of the existing A428 carriageway.	Work Nos. 80c, 85	Yes	Construction of a bridleway crossing adjacent to the existing A428	No instruction
09/03a	St Neots	9/3a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the Cambridge Road Junction.	Work Nos. 80a	No	-	No instruction
09/04a	St Neots	9/4a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the Cambridge Road Junction.	Work Nos. 80a	No	-	No instruction
09/05a	St Neots	9/5a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the Cambridge Road Junction.	Work Nos. 80a	No	-	Meetings arranged for 2/8/21 and 11/8/21, but unable to attend. To be rearranged
09/06a	Abbotsley	9/6a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the Cambridge Road Junction.	Work Nos. 80a	No	-	Meetings arranged for 2/8/21 and 11/8/21, but unable to attend. To be rearranged
09/06d	Abbotsley	9/6d	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway and Cambridge Road Junction.	Work Nos. 57, 80b	No	-	Meetings arranged for 2/8/21 and 11/8/21, but unable to attend. To be rearranged
09/06g	Abbotsley	9/6g	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the accommodation bridge and realigned access track.	Work No. 85	No	-	Meetings arranged for 2/8/21 and 11/8/21, but unable to attend. To be rearranged
09/07a	Abbotsley	9/7a	Required to provide a temporary construction area, including temporary storage, laydown areas, access and working space to facilitate the construction of the Cambridge Road Junction and the attenuation basin west of the junction.	Work Nos. 79, 80a	No	-	Discussions proceeding with freeholder.
09/07c	Abbotsley	9/7c	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway and Cambridge Road Junction.	Work Nos. 57, 80b, 80c	No	-	Discussions proceeding with freeholder.
09/07d	Abbotsley	9/7d	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway and Cambridge Road Junction.	Work Nos. 57, 80c	No	-	Discussions proceeding with freeholder.

09/07h	Abbotsley	9/7h	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway.	Work No. 57	No	-	Discussions proceeding with freeholder.
09/07i	Abbotsley	9/7i	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the Cambridge Road Junction.	Work Nos. 80c	Yes	Construction of a drainage ditch	Discussions proceeding with freeholder.
09/07k	Abbotsley	9/7k	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway, attenuation basin east of the Cambridge Road Junction, and the access track to this basin from the realigned existing A428.	Work Nos. 57, 80c, 84	Yes	Regrading of the land to facilitate the new dual carriageway construction	Discussions proceeding with freeholder.
09/07l	Abbotsley	9/7l	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway, accommodation bridge and realigned access track.	Work Nos. 57, 85	No	-	Discussions proceeding with freeholder.
09/08b	Abbotsley	9/8b	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the accommodation bridge and realigned access track.	Work No. 85	No	-	No instruction
09/10a	Abbotsley	9/10a	Required to provide temporary storage, laydown areas, access and working space to facilitate works to existing Bridleway 1/18.	Work No. 85	No	-	No instruction
09/11b	Abbotsley	9/11b	Required to provide temporary storage, laydown areas, access and working space to facilitate works to existing Bridleway 1/18, as well as the de-trunking of the existing A428 carriageway.	Work No. 85	No	-	No instruction
09/12b	Abbotsley	9/12b	Required to provide temporary storage, laydown areas, access and working space to facilitate works to existing Bridleway 1/18.	Work No. 85	No	-	Discussions proceeding with freeholder.
10/01a	Abbotlsey; Croxton	10/1a	Required to provide temporary storage, laydown areas, access and working space to facilitate the de-trunking of the existing A428 carriageway.	-	No	-	No instruction
10/02a	Abbotsley	10/2a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the accommodation bridge and realigned access track.	Work No. 85	No	-	Meetings arranged for 2/8/21 and 11/8/21, but unable to attend. To be rearranged
10/04a	Abbotsley	10/4a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the accommodation bridge and realigned access track.	Work No. 85	No	-	No instruction
10/04b	Abbotsley	10/4b	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway, the accommodation bridge and realigned access track, the culverts at Fox Brook and Gallow Brook, and the attenuation basin west of Toseland Road, as well as the de-trunking of the existing A428.	Work Nos. 57, 85, 86, 87, 88	No	-	No instruction
10/04c	Abbotsley; Toseland	10/4c	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway, the accommodation bridge and realigned access track, the culverts at Fox Brook and Gallow Brook, and the realigned Toseland Road.	Work Nos. 57, 85, 86, 87, 89	Yes	Construction of a watercourse tie in	No instruction
10/05b	Abbotsley	10/5b	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the accommodation bridge and realigned access track.	Work No. 85	No	-	No instruction
10/05d	Abbotsley	10/5d	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the accommodation bridge and realigned access track.	Work No. 85	No	-	No instruction
10/07a	Abbotsley	10/7a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the accommodation bridge and realigned access track.	Work No. 85	No	-	
11/01a	Croxton	11/1a	Required to provide temporary storage, laydown areas, access and working space to facilitate the de-trunking of the existing A428 carriageway.	-	No	-	None, HE owner
11/01b	Croxton	11/1b	Required to provide temporary storage, laydown areas, access and working space to facilitate the de-trunking of the existing A428 carriageway.	-	No	-	None, HE owner

11/01c	Croxton	11/1c	Required to provide temporary storage, laydown areas, access and working space to facilitate the de-trunking of the existing A428 carriageway.	-	No	-	None, HE owner
11/01d	Croxton	11/1d	Required to provide temporary storage, laydown areas, access and working space to facilitate the de-trunking of the existing A428 carriageway.	-	No	-	None, HE owner
11/03a	Croxton	11/3a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned Toseland Road and the de-trunking of the existing A428 carriageway.	Work No. 89	No	-	None, HE owner
11/04a	Toseland	11/4a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway and the realigned Toseland Road.	Work Nos. 57, 89	Yes	Construction of the field access	No instruction
11/04c	Croxton	11/4c	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the realigned Toseland Road and the attenuation basin west of Toseland Road.	Work Nos. 88, 89	Yes	Construction of the field access	No instruction
11/04f	Croxton; Yelling	11/4f	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway and the realigned Toseland Road.	Work Nos. 57, 89	Yes	Construction of the field access and the field access track	No instruction
11/04g	Yelling	11/4g	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway.	Work No. 57	Yes	Construction of the field access Regrading of the land to facilitate the new dual carriageway construction	No instruction
12/01a	Croxton	12/1a	Required to provide temporary storage, laydown areas, access and working space to facilitate the de-trunking of the existing A428 carriageway.	-	No	-	None, HE owner
12/01b	Croxton	12/1b	Required to provide temporary storage, laydown areas, access and working space to facilitate the de-trunking of the existing A428 carriageway.	-	No	-	None, HE owner
12/01c	Croxton	12/1c	Required to provide temporary storage, laydown areas, access and working space to facilitate the de-trunking of the existing A428 carriageway.	-	No	-	None, HE owner
12/01d	Eltisley	12/1d	Required to provide temporary storage, laydown areas, access and working space to facilitate the de-trunking of the existing A428 carriageway.	-	No	-	None, HE owner
12/01e	Eltisley	12/1e	Required to provide temporary storage, laydown areas, access and working space to facilitate the diversion of underground utilities and the de-trunking of the existing A428.	Work No. 95	No	-	None, HE owner
12/02a	Croxton	12/2a	Required to provide temporary storage, laydown areas, access and working space to facilitate the de-trunking of the existing A428 carriageway.	-	No	-	No instruction
12/02b	Croxton	12/2b	Required to provide temporary storage, laydown areas, access and working space to facilitate the de-trunking of the existing A428 carriageway.	-	No	-	No instruction
12/02c	Eltisley	12/2c	Required to provide temporary storage, laydown areas, access and working space to facilitate the de-trunking of the existing A428 carriageway.	-	No	-	No instruction
12/03a	Yelling	12/3a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway.	Work No. 57	No	-	No instruction
12/03c	Yelling	12/3c	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway.	Work No. 57	No	-	No instruction
12/04b	Yelling	12/4b	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway.	Work No. 57	No	-	No instruction
12/05a	Yelling	12/5a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway.	Work No. 57	No	-	Meeting rearranged till after harvest
12/06b	Yelling; Eltisley	12/6b	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway and the access track west of Eltisley link.	Work Nos. 57, 91, 98a	Yes	Construction of a drainage ditch	No instruction

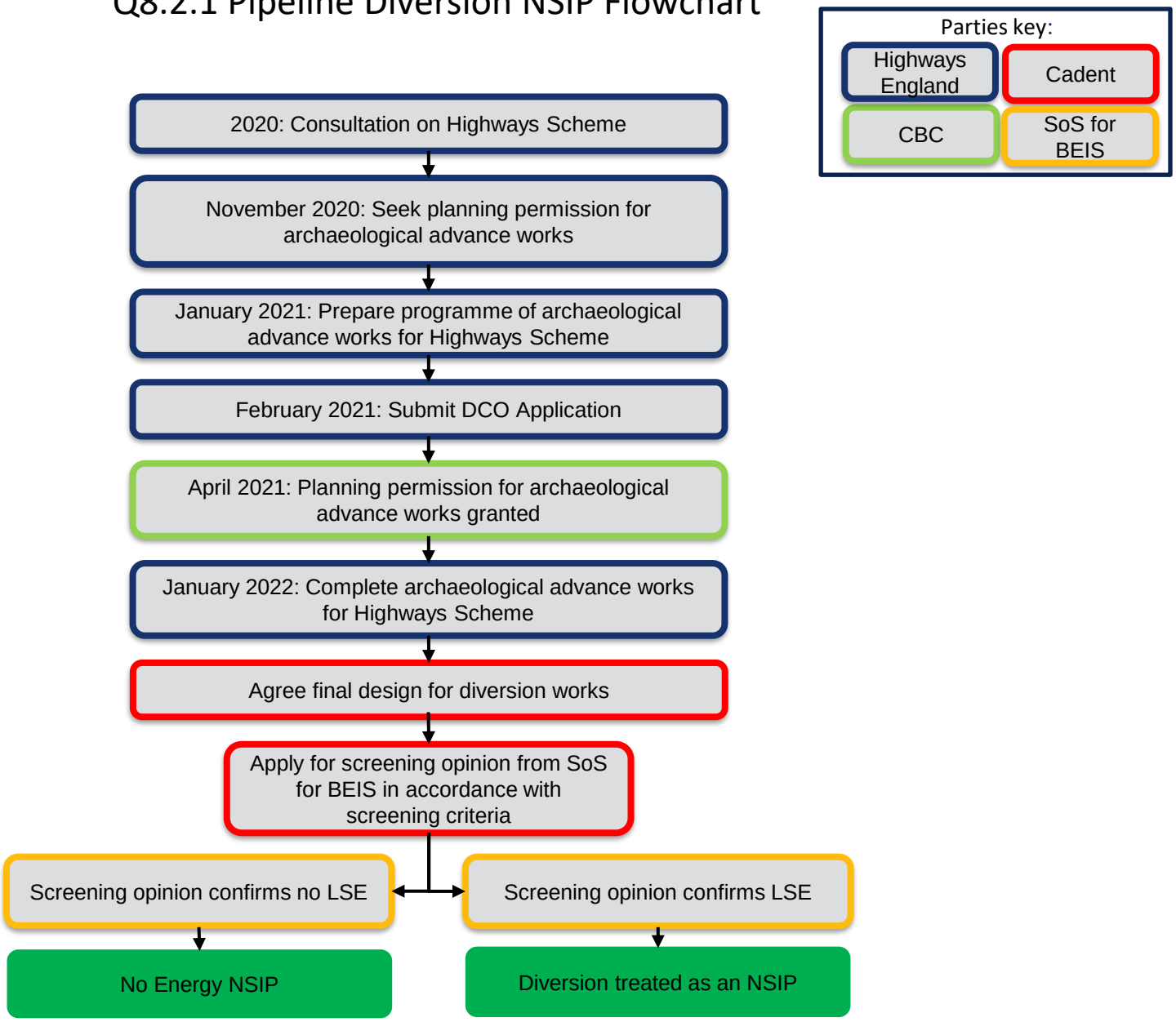
12/06c	Yelling; Eltisley	12/6c	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway and the Combined bridleway and watercourse underpass to the north of Eltisley.	Work Nos. 57, 91, 92	Yes	Construction of a drainage ditch	No instruction
12/06g	Eltisley	12/6g	Required to facilitate the construction of the Combined bridleway and watercourse underpass to the north of Eltisley, also providing temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway and the Eltisley link.	Work Nos. 91, 92, 98a, 98b	No	-	No instruction
12/06i	Eltisley	12/6i	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the Eltisley link.	Work Nos. 98a	No	-	No instruction
13/02e	Eltisley	13/2e	Required to provide temporary storage, laydown areas, access and working space to facilitate the de-trunking of the existing A428 carriageway.	-	Yes	Construction of access to attenuation basin	No instruction
13/04f	Eltisley	13/4f	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway.	Work No. 91	No	-	No instruction
13/04g	Eltisley	13/4g	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the Eltisley link.	Work Nos. 98c	No	-	No instruction
13/04k	Eltisley	13/4k	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway and the access track from the Eltisley South roundabout.	Work Nos. 91, 98b	Yes	Construction of the field access track	No instruction
13/05b	Eltisley	13/5b	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the Eltisley link and the diversion of an underground utility.	Work Nos. 98c, 99	No	-	No instruction
13/06a	Eltisley	13/6a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the Eltisley link and the diversion of an underground utility.	Work Nos. 98c, 99	Yes	Construction of the shared footway/cycleway as part of the Eltisley Link	No instruction
13/07a	Eltisley	13/7a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the Eltisley link.	Work Nos. 98c	No	-	No instruction
13/10a	Eltisley	13/10a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the Eltisley link.	Work Nos. 98b, 98d, 98e	No	-	No instruction
13/10e	Eltisley	13/10e	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway and the Eltisley link.	Work Nos. 91, 98e	No	-	No instruction
13/10f	Eltisley	13/10f	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the Caxton Gibbet junction.	Work Nos. 109a	No	-	No instruction
13/11a	Eltisley	13/11a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway and the Eltisley link.	Work Nos. 91, 98e	No	-	No instruction
13/12b	Eltisley	13/12b	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the Eltisley link.	Work Nos. 98e	No	-	No instruction
14/02b	Caxton	14/2b	Required to provide temporary access and working space to facilitate the construction of the Caxton Gibbet junction and the diversion of underground utilities.	Work Nos. 103, 104, 109b	Yes	Improvements to the A1198, including the construction of the shared footway/cycleway	None, HE owner
14/04c	Cambourne; Caxton	14/4c	Required to provide temporary access and working space to facilitate the construction of the Caxton Gibbet junction and the diversion of underground utilities.	Work Nos. 103, 104, 109b	Yes	Improvements to the A1198, including the construction of the shared footway/cycleway	No instruction
14/06a	Eltisley; Papworth Everard	14/6a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the Caxton Gibbet junction.	Work Nos. 109a	No	-	No instruction
14/06c	Eltisley; Papworth Everard	14/6c	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the Caxton Gibbet junction.	Work Nos. 109a	No	-	No instruction

14/06d	Eltisley; Papworth Everard	14/6d	Required to provide temporary storage, laydown areas, access and working space to facilitate a construction area north-west of the Caxton Gibbet junction, and the construction of the Caxton Gibbet junction.	Work Nos. 106, 109a	No	-	No instruction
14/07c	Eltisley	14/7c	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway and the westbound onslip road from the Caxton Gibbet junction.	Work Nos. 91, 103	No	-	No instruction
14/08a	Caxton	14/8a	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the dual carriageway and the westbound onslip road from the Caxton Gibbet junction.	Work Nos. 91, 103	No	-	No instruction
14/08b	Caxton	14/8b	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the westbound onslip road from the Caxton Gibbet junction.	Work No. 91	No	-	No instruction
14/08f	Caxton	14/8f	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the westbound onslip road from the Caxton Gibbet junction, and the Caxton Gibbet junction.	Work Nos. 91, 109b, 109d	No	-	No instruction
14/10b	Papworth Everard	14/10b	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the Caxton Gibbet junction and the diversion of underground utilities.	Work Nos. 103, 104, 109b, 109d	No	-	Discussions proceeding with freeholder.
14/11a	Papworth Everard	14/11a	Required to provide temporary access and working space to facilitate a construction area north-west of the Caxton Gibbet junction, the construction of the Caxton Gibbet junction, and the diversion of underground utilities.	Work Nos. 104a, 106, 107, 109b	Yes	Improvements to the A1198, including the construction of the shared footway/cycleway	No instruction
14/11b	Cambourne; Caxton	14/11b	Required to provide temporary access and working space to facilitate the construction of the Caxton Gibbet junction and the diversion of underground utilities.	Work Nos. 103, 104, 109b	Yes	Improvements to the A1198, including the construction of the shared footway/cycleway	No instruction
14/13a	Papworth Everard	14/13a	Required to provide temporary access and working space to facilitate the construction of the Caxton Gibbet junction.	Work Nos. 109b	No	-	Discussions proceeding with freeholder.
14/15b	Elsworth; Papworth Everard	14/15b	Required to provide temporary storage, laydown areas, access and working space to facilitate the construction of the Caxton Gibbet junction.	Work Nos. 109b	No	-	Discussions proceeding with freeholder.
14/16b	Elsworth	14/16b	Required to provide temporary storage, laydown areas, access and working space to facilitate a construction area north-east of the Caxton Gibbet junction, the construction of the Caxton Gibbet junction, and the diversion of overhead utilities.	Work Nos. 109c, 110, 111	No	-	Discussions proceeding with freeholder.
15/02a	Elsworth	15/2a	Required to provide temporary access and working space to facilitate the construction of the shared access and bridleway from the Caxton Gibbet junction north roundabout, and the diversion of overhead utilities.	Work Nos. 109c, 110	Yes	Construction of the accommodation track and bridleway tie in at Brockley Road	None, HE owner
15/04b	Elsworth	15/4b	Required to provide temporary access and working space to facilitate a construction area north-east of the Caxton Gibbet junction, the construction of the shared access and bridleway from the Caxton Gibbet junction north roundabout, and the diversion of overhead utilities.	Work Nos. 109c, 110, 111	No	-	No instruction
15/06b	Elsworth	15/6b	Required to provide temporary storage, laydown areas, access and working space to facilitate a construction area north-east of the Caxton Gibbet junction, the construction of the Caxton Gibbet junction, and the diversion of overhead utilities.	Work Nos. 109c, 110, 111	No	-	Discussions proceeding with freeholder.
16/01a	Great Barford	16/1a	Required to provide access and working space to facilitate a temporary vehicle recovery area off the A421 eastbound carriageway.	-	No	-	None, HE owner
16/01b	Tempsford	16/1b	Required to facilitate the construction of a highway gantry in the A1 northbound verge and to provide temporary access and working space.	-	Yes	Construction of a highway gantry	None, HE owner
16/01c	Wyboston, Chawston and Colesden	16/1c	Required to facilitate the construction of a highway gantry in the A421 eastbound verge and to provide temporary access and working space.	-	Yes	Construction of a highway gantry	None, HE owner

16/02a	Hail Weston	16/2a	Required to provide access and working space to facilitate a temporary vehicle recovery area off Kimbolton Road/B645.	-	No	-	None, HE owner
16/03a	Tempsford	16/3a	Required to provide temporary access and working space to facilitate the construction of a highway gantry in the A1 northbound verge.	-	No	-	None, HE owner
16/03b	Tempsford	16/3b	Required to provide temporary access and working space to facilitate the construction of a highway gantry in the A1 northbound verge.	-	No	-	None, HE owner
16/05a	Hail Weston	16/5a	Required to provide a temporary vehicle recovery area off Kimbolton Road/B645.	-	No	-	Recent respondent, meeting to be arranged
16/06a	Hail Weston	16/6a	Required to provide access and working space to facilitate a temporary vehicle recovery area off Kimbolton Road/B645.	-	No	-	No instruction
16/07a	Great Barford	16/7a	Required to provide a temporary vehicle recovery area off the A421 eastbound carriageway.	-	No	-	No instruction
16/08a	Tempsford	16/8a	Required to provide access and working space to facilitate a temporary vehicle recovery area off Tempsford Road.	-	No	-	No instruction
16/09a	Tempsford	16/9a	Required to provide a temporary vehicle recovery area off Tempsford Road.	-	No	-	Recent respondent, meeting to be arranged
16/10a	Tempsford	16/10a	Required to provide temporary access and working space to facilitate the construction of a highway gantry in the A1 northbound verge.	-	No	-	No instruction

Appendix to Q.1.8.2.1

Q8.2.1 Pipeline Diversion NSIP Flowchart



Appendix to Q.1.11.6.4

Ref	Footpath/ bridleway No.	Jurisdiction	Type of PRoW to be removed	Length Removed (km)	Type of PRoW to be added	Length Added (km)	Net Length (km)	Comments	SROWA Sheet No.	SROWA Ref No.
PRoW1	10	Bedford Borough Council	Footpath	0.105	Footpath	0.415	0.31		1	Removed - a/7 to a/8 Added - 1/1 to 1/2
PRoW2	36	Bedford Borough Council	Footpath	0.13	N/a	0	-0.13		1	Removed - a/3 to a/5
PRoW3	7	Bedford Borough Council	Footpath	0.09	N/a	0	-0.09		1	Removed - a/1 to a/2
PRoW4	8	Bedford Borough Council	Footpath	0.123	N/a	0	-0.123		1	Removed - a/4 to a/6
PRoW5	New bridleway	Bedford Borough Council	N/A	0	Bridleway	0.511	0.511	Stopped up School Lane converted to bridleway and private means of access	1	Added - 1/14 to 1/15
PRoW6	New bridleway	Bedford Borough Council	N/A	0	Bridleway	0.394	0.394		1	Added - 1/12 and 1/13

Ref	Footpath/ bridleway No.	Jurisdiction	Type of PRoW to be removed	Length Removed (km)	Type of PRoW to be added	Length Added (km)	Net Length (km)	Comments	SROWA Sheet No.	SROWA Ref No.
PRoW7	1/9	Cambridgeshire County Council	Footpath	0.28	Footpath	0.31	0.03		6	Removed - f/1 to f/2 Added - 6/1 to 6/2 to 6/3
PRoW8	1/20	Cambridgeshire County Council	Footpath	0.516	N/A	0	-0.516		6	Removed - f/3 to f/4
PRoW9	1/19	Cambridgeshire County Council	Footpath	0.457	N/A	0	-0.457		6	Removed h/3 to h/4
PRoW10	1/17	Cambridgeshire County Council	Footpath	0.12	Footpath	0.729	0.609	This proposed footpath is part of the route from 6/2 to 8/1 to 8/3 in the dDCO which is 1406m. In conjunction to PRoW11	8	Removed - h/1 to h/2 Added - 8/3 to 8/1 to h/1
PRoW11	New footpath	Cambridgeshire County Council	N/A	0	Footpath	0.677	0.677	This proposed footpath is part of the route from 6/2 to 8/1 to 8/3 in the dDCO which is 1406m. In conjunction to PRoW10	6,8	Added - 6/2 to h/1
PRoW12	1/16	Cambridgeshire County Council	Footpath	0.404	Footpath	0.16	-0.244		8	Removed - h/5 to h/6 Added - 8/1 to 8/2

Ref	Footpath/ bridleway No.	Jurisdiction	Type of PRoW to be removed	Length Removed (km)	Type of PRoW to be added	Length Added (km)	Net Length (km)	Comments	SROWA Sheet No.	SROWA Ref No.
PRoW13	1/18	Cambridgeshire County Council	Bridleway	0.425	Bridleway	0.585	0.16		9,10	Removed - i/1 to j/1 Added - 9/12 to 9/14 to 9/12 to 10/1
PRoW14	278/7	Cambridgeshire County Council	Footpath	0.075	Footpath	2.079	2.004	This length includes the footway provision adjacent to the Toseland Road	11	Removed - k/1 to k/2 Added - 11/5 through to 11/18
PRoW15	74/6	Cambridgeshire County Council	Bridleway	0.18	Bridleway	0.2	0.02		12	Removed l/1 to l/2 Added - 12/1 to 12/2
PRoW16	New bridleway	Cambridgeshire County Council	N/A	0	Bridleway	0.975	0.975	This replaces the existing footway/ cycleway that was formerly Footpath 73/17	14,15	Added - 14/5 to 15/1
	Total						**4.13**			

Appendix to Q.1.11.6.5

Ref	Name	Jurisdiction	Type of "Way" to be removed	Length Removed (km)	Type of "Way" to be added	Length Added (km)	Net Length (km)	Comment	SROWA Sheet No.	SROWA Ref No.
NMU01	A1 Northbound	Bedford Borough Council	Footway	2.178	N/A	0	-2.178	Footway to be removed and replaced with Ref NMU02 to NMU05.	1, 2	N/A
NMU02	Kelpie Marina Access Road	Bedford Borough Council	N/A	0	Cycle track with a right of way on foot	0.414	0.414	Provision added.	1	1/9 through to 1/11
NMU03	Bedford Road	Bedford Borough Council	Cycle track with a right of way on foot	0.361	Cycle track with a right of way on foot	0.245	-0.116	Truncated cycle track from existing Black Cat roundabout. Extended cycle track to proposed Roxton Road junction.	1	1/9 through to 1/7

Ref	Name	Jurisdiction	Type of "Way" to be removed	Length Removed (km)	Type of "Way" to be added	Length Added (km)	Net Length (km)	Comment	SROWA Sheet No.	SROWA Ref No.
NMU04	Roxton Road	Bedford Borough Council	Cycle track with a right of way on foot	0.533	Cycle track with a right of way on foot	0.538	0.005	Maintained provision of cycle track alongside realigned Roxton Road.	1	1/3 through to 1/6
NMU05	Roxton Road Link	Bedford Borough Council	N/A	0	Cycle track with a right of way on foot	1.756	1.756	Provision added.	1,2	1/16 through to 1/18, 2/1 though to 2/7
NMU06	A1 Southbound Footway along A1 Services Link	Bedford Borough Council	Footway	0.411	Footway	0.531	0.12	Replaced and extended footway Along A1 services link.	1,2	1/19 to 2/10 to 2/11 to 2/12
NMU07	Cambridge Road Junction	Cambridgeshire County Council	Footway	0.911	Cycle track with a right of way on foot	0.995	0.084	Upgraded provision through junction.	8,9	8/4 through to 9/11
NMU08	Toseland Road	Cambridgeshire County Council	N/A	0	Footway	0.371	0.371	Provision added to facilitate the	11	11/1 through to 11/4

Ref	Name	Jurisdiction	Type of "Way" to be removed	Length Removed (km)	Type of "Way" to be added	Length Added (km)	Net Length (km)	Comment	SROWA Sheet No.	SROWA Ref No.
								PRoW diversion of FP278/7.		
NMU09	Eltisley Link	Cambridgeshire County Council	N/A	0	Cycle track with a right of way on foot	1.321	1.321	Provision added.	13	13/1 through to 13/4
NMU10	Existing Footway/Cycleway at Caxton Gibbet roundabout	Cambridgeshire County Council	Cycle track with a right of way on foot	1.09	N/A	0	-1.09	Existing cycle track around circulatory to the Shell garage to be removed and replaced by Ref NMU11. Existing cycle track to Brockley Road to be replaced by new bridleway.	14,15	N/A

Ref	Name	Jurisdiction	Type of "Way" to be removed	Length Removed (km)	Type of "Way" to be added	Length Added (km)	Net Length (km)	Comment	SROWA Sheet No.	SROWA Ref No.
NMU11	Caxton Gibbet Junction - Realigned A428	Cambridgeshire County Council	N/A	0	Cycle track with a right of way on foot	0.975	0.975	Provision added.	13,14	13/5 through to 14/3
NMU12	Caxton Gibbet Junction - A1198	Cambridgeshire County Council	N/A	0	Cycle track with a right of way on foot	0.672	0.672	Provision added.	14	14/4 to 14/6, 14/7 to 14/11
	Total						**2.334**			

Appendix to Q.1.15.4.2

A428 Black Cat to Caxton Gibbet

Option Assessment Report

March 2016

A428 Black Cat to Caxton Gibbet

Project no: B2074900
Document title: Option Assessment Report
Document No.: B2074900/A6S/JAC/A428/XX/RP/PM/00025

Revision: 0
Date: 17 March 2016
Client name: Highways England
Client no:
Project manager: Simon Beaney
Author: Robert Benson

Jacobs U.K. Limited

1180 Eskdale Road
Winnersh, Wokingham
Reading RG41 5TU
United Kingdom
T +44 (0)118 946 7000
F +44 (0)118 946 7001
www.jacobs.com

Document history and status

Revision	Date	Description	By	Review	Approved
0	29/01/2016	Draft for client review	RB	SM/DW	SB
1	17/03/2016	Final	RB	TB	SB

Contents

1. Introduction

1.1 Purpose of report

Jacobs has been commissioned by Highways England to progress a number of the proposals announced in the Autumn Statement 2014 (AS14) Roads Investment Strategy[1] (RIS) through the Project Control Framework (PCF) Stage 0 process. This commission relates to proposals in the east of England Areas 6 and 8 including schemes for the A428. This report presents the proposals for the A428 Black Cat to Caxton Gibbet.

The purpose of this report is to present the outcomes of the first stage of a WebTAG scheme appraisal process in the form of an Option Assessment Report (OAR). The report is an update of an existing OAR document for the scheme entitled 'Route Strategies: Option Assessment Report, A428: A421 to Caxton Gibbet, September 2014' produced by consultants AECOM. This report is one of a number of deliverables being produced at this stage of scheme development which also include a Strategic Outline Business Case (SOBC) and an Appraisal Specification Report (ASR).

The key outcomes of this stage of the project are to:

- review and document the current situation
- analyse the future situation
- identify need for intervention and establish SMART targets / objectives that are consistent with Highways England policies and desired outcomes
- generate options that address the targets and objectives
- review and assess the potential options

1.2 Background

Following the 2013 Spending Review, the Government announced its plans for the biggest ever upgrade of the strategic roads network (SRN). The HM Treasury document, Investing in Britain's Future[2] set out details of the programmes of infrastructure investment, which included the tripling of investment on Highways England major roads enhancements from today's levels to over £3 billion annually by 2020/21.

In April 2014 Highways England published its evidence reports for the 18 Route Based Strategies (RBS) which collectively cover the SRN. The full RBSs were published in March 2015. The Felixstowe to Midlands Route Strategy is pertinent to this study. The purpose of the strategy is to:

- be clear about what Highways England intend to do where, why and when within a five year spending control period
- outline Highways England priorities for the five year period and beyond
- provide details about the proposed investment to improve asset condition and the vision for customer operations service
- inform the RIS investment plan for the current five year period

The RBSs are being used to assist generating efficiencies for Highways England's future investment plans and performance improvements, providing improvement in customer experience, and better informing the public. The intent is that the RBSs will also act as a catalyst for the further development and delivery of scheme priorities which tackle the most important challenges and opportunities for customers. Possible solutions for priority sections of the 18 routes were identified through this process.

[1] DfT, 2015. *Road Investment Strategy: for the 2015/16-2019/20 Road Period*.
https://www.gov.uk/government/publications/road-investment-strategy-for-the-2015-to-2020-road-period
[2] HM Treasury, 2013. Investing in Britain's Future.
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/209279/PU1524_IUK_new_template.pdf

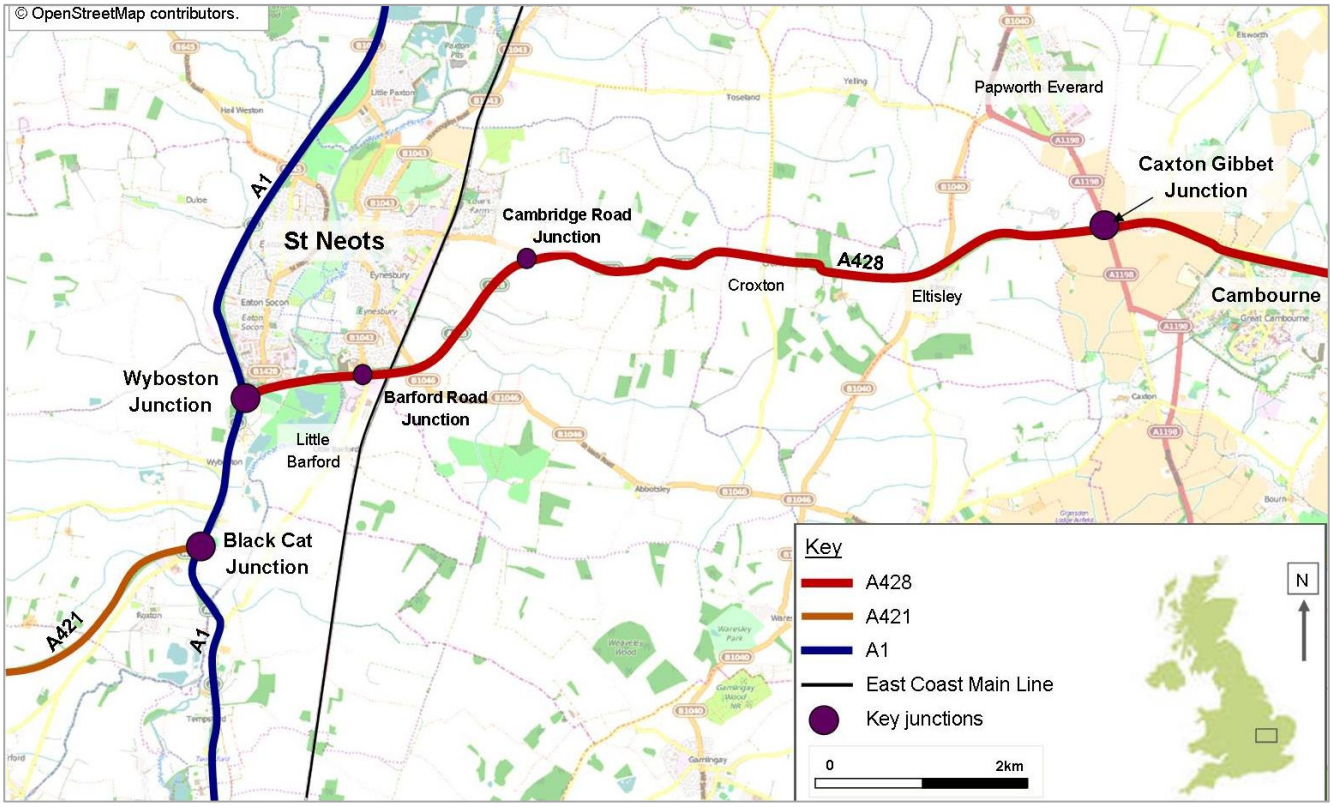


Figure 1.1 : A428 Black Cat to Caxton Gibbet – geographical area

Figure 1.1 illustrates the location of the A428 between Black Cat and Caxton Gibbett. The A428 forms part of the Felixstowe to Birmingham corridor which is an important strategic link connecting seaports on the east coast of England to the Midlands, is part of the trans-European network, and intersects with other major north-south road corridors.

The A428 is a strategic route for vehicles travelling east-west between Oxford and Cambridge, via urban settlements including Milton Keynes and Bedford. The A428 extends approximately 17 miles between the A1 and A14/M11. The A428 is a single lane carriageway between the A1 and A1198 at Caxton Gibbet, being the only section of the A428 that is not dual carriageway.

The A428 was identified as experiencing significant junction capacity issues; specifically, the Felixstowe to Midlands Route Strategy highlighted the following issues and opportunities:

- Junction capacity improvements at the Black Cat Roundabout
- Severe lack of capacity (links and junctions) on the A428 between the A1 and A1198
- Creating an expressway by 'filling the gap' between the Black Cat Roundabout and A428/ A1198 Caxton Gibbet Roundabout

This OAR includes consideration of the intersections with the A1 at the Black Cat Roundabout and Wyboston junctions. This OAR considers the upgrade for the section of the A428 between the Caxton Gibbet and the junction with the A1.

1.3 Overview of assessment

The overall approach to the project has been developed to align with the requirements of the Highways England PCF process, and for the purposes of this commission includes the following stages:

- Step 1: Review and gap analysis of existing document
- Step 2: Update and further develop OAR

- Step 3: Update and further develop SOBC
- Step 4: Deliver ASR and complete PCF Stage 0

This OAR draws upon a review and gap analysis and informs the SOBC. This OAR will provide the following, in order to meet the requirements set out within the DfT Transport Appraisal Process[3]:

- A sound body of analysis to provide evidence of the problems, challenges and need for intervention, framed within the context of relevant policy and strategy objectives
- A future 'without intervention' scenario, considering potential scenarios
- Identified study objectives and intended outcomes, and sufficient information to facilitate an understanding of the links between issues and context and the final statement of objectives
- Details of the stakeholder engagement strategy adopted
- Option generation, initial sifting, and assessment. Decisions made on discarded options will be recorded, along with supporting evidence
- Development of options, including concept plans to identify the key areas for intervention with cost estimates. Early Assessment and Sifting Tool (EAST) will be used to prioritise the options

The DfT's Transport Appraisal Process describes the steps to be undertaken in the stage 1 (option development) process. These are outlined in Figure 1.2 below and described in more detail in the following sections of this OAR.

[3] DfT, 2014. *Transport Analysis Guidance: The Transport Appraisal Process*. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/275728/webtag-tag-transport-appraisal-process.pdf

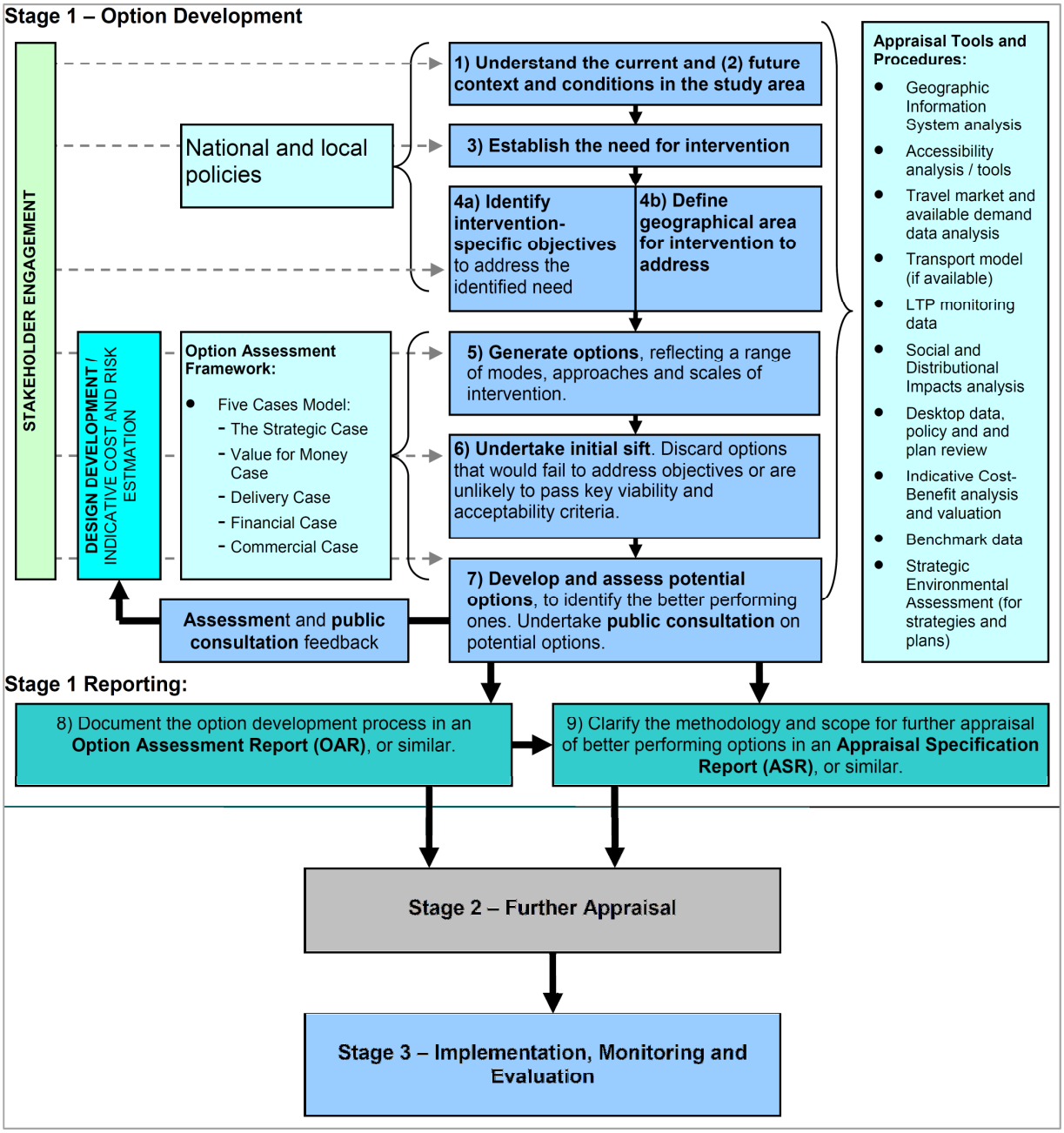


Figure 1.2 : Stage 1 (option development) process (source: WebTAG Transport Appraisal Process)

1.4 Structure of report

This report follows the steps relating to the stage 1 process as set out in WebTAG and summarised above. The structure of this OAR is as follows:

- **Section 1** – Introduction – outlines the purpose and background of the report.
- **Section 2** – Policy and literature review – reviews relevant policy and strategy documents to establish the strategic policy context in the study area.
- **Section 3** – Current situation – describes existing transportation conditions to provide an understanding of existing transport supply and demand.
- **Section 4** – Future situation – presents forecast traffic conditions under a 'without intervention' scenario and describes future land-uses and policies, and committed changes to the transport system.

- **Section 5** – Need for intervention – summarises current and future transport-related problems and underlying causes that establish the need for an intervention.
- **Section 6** – Objectives and area of impact – sets out the objectives of the study and geographical area of impact.
- **Section 7** – Option generation – develops a range of interventions in order to achieve the study objectives identified.
- **Section 8** – Option sifting - summarises the results of the EAST.
- **Section 9** – Option assessment – assesses potential options against the '5 cases model' criteria.
- **Section 10** – Summary and next steps – summarises the results of this OAR and presents the preferred option.

2. Policy and literature review

2.1 Introduction

This section outlines the key policies and strategies relating to planning and transportation within the study area, as articulated at a national, regional and local level.

In developing an understanding of the current situation, it is important to establish the strategic policy context for the scheme. This process identifies strategic objectives including the aims of the scheme promoting organisation and adopted and emerging land use policy that may have implications for the A12 proposals. A summary has been provided in Figure 2.1.

It is important to ensure that the development and appraisal of any interventions in the OAR process is consistent with policies and objectives. To ensure that the scheme development process retains a focus on delivering Highways England priorities, a set of scheme objectives and targets are developed that align with the RIS Plan / Performance Specification Requirements and the Highways England Strategic Business Plan, as well as wider complementary policy objectives.

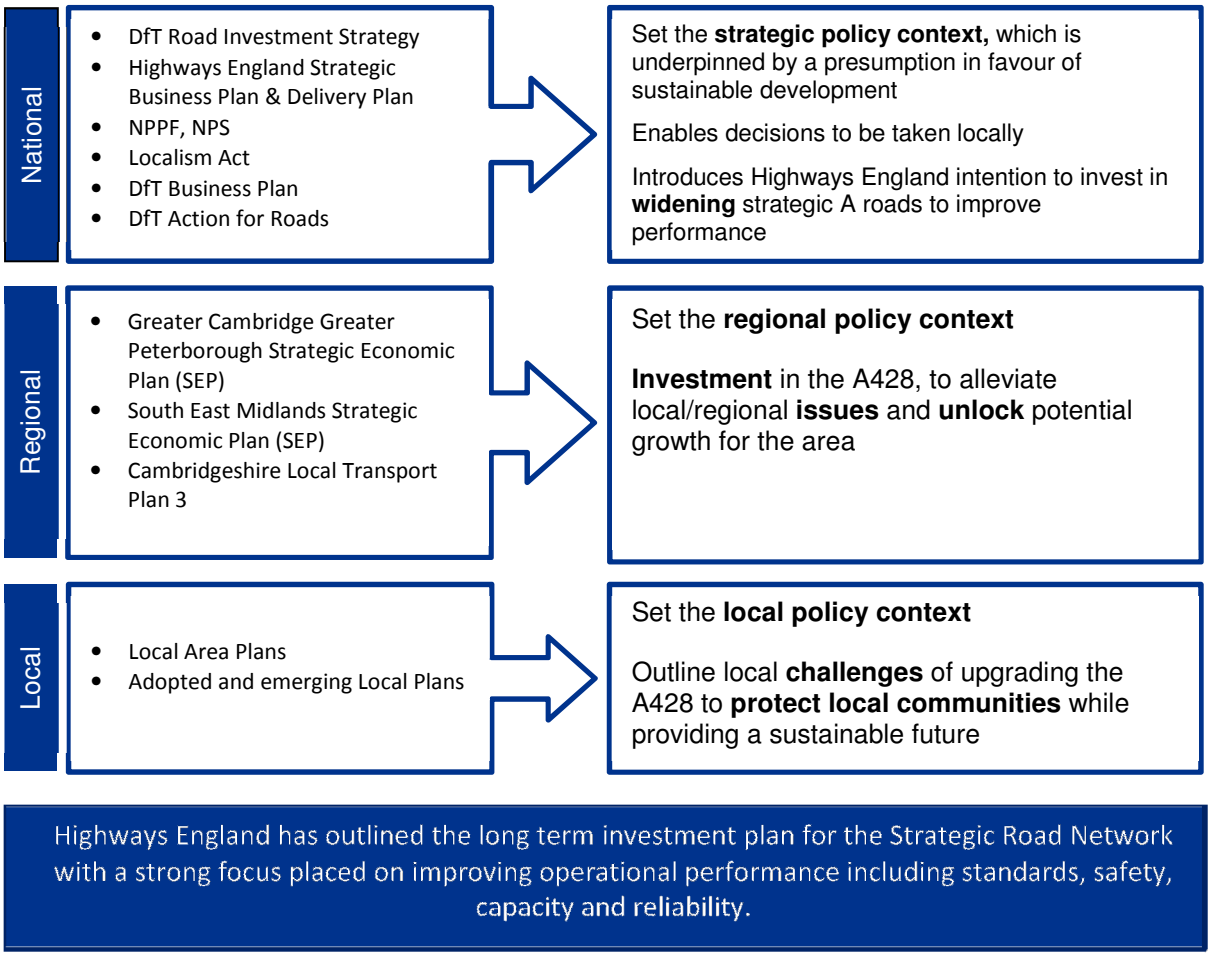


Figure 2.1 : Key policy documents

The SRN is entering a time of transformation as the Highways Agency has transitioned to a government-owned strategic highways company, Highways England. Furthermore, transport and land use policy has been and continues to be in a state of change and development; therefore the information presented in this report is accurate at the time of writing but may change during the course of the scheme and business case development.

2.2 National policy

2.2.1 DfT's Road Investment Strategy

In March 2015 the DfT released the RIS which outlines the Government's long term ambition to revolutionise and modernise the SRN. It sets out a vision for a smoother, safer and more reliable network by 2040. The RIS contains an investment plan and performance requirements for how this vision can be achieved. In the first period, the Government has committed to investing £15.2 billion on over 100 major schemes and the performance of these will be assessed in eight key areas:

- Making the network safer
- Improving user satisfaction
- Supporting the smooth flow of traffic
- Encouraging economic growth
- Delivering better environmental outcomes
- Helping cyclists, walkers and other vulnerable users of the network
- Achieving real efficiency
- Keeping the network in good condition

2.2.2 Highways England policy

Highways England aim to make best use of the increased certainty of long term funding. As outlined in the Business Plan, this will be achieved through modernising, maintaining and operating national roads to support safer, more efficient journeys which improve driver satisfaction. As part of modernising the network, an emphasis is placed on the importance of expanding the smart motorways programme and the upgrading of some of the most important major 'A' roads, transforming them into 'expressways'. An expressway is defined as a high speed, restricted access, dual carriageway (at least two lanes each way) which is entirely grade separated with focused operational control (including an on-road traffic officer presence).

Highways England's Delivery Plan[4] was published in March 2015 and set out how the strategic outcomes would be delivered during the first five year period to 2020. The plan also outlines how success will be measured and monitored against the RIS performance specification.

2.2.3 National Planning Policy Framework (NPPF)

In March 2012, the Department for Communities and Local Government (DCLG) published NPPF[5], which sets out the Government's economic, environmental and social planning policies. The NPPF aims to reform the planning system and is underpinned by a presumption in favour of sustainable development. There is a focus on planning for prosperity, people and places, promoting increased levels of development and supporting infrastructure, whilst also protecting and enhancing the natural and historic environment.

[4] Highways England, 2015 Delivery Plan 2015-2020
https://www.gov.uk/government/publications/highways-england-delivery-plan-2015-2020

[5] Department for Communities and Local Government, 2012. *National Planning Policy Framework.*
http://www.communities.gov.uk/documents/planningandbuilding/pdf/2116950.pdf

2.2.4 Localism Act

The Government's Localism Act[6] provides the legislative foundation for this change. The Act decentralises power, giving local government new freedom and flexibilities; provides new rights and powers for communities and individuals; reforms the planning system; and enables decisions to be taken locally.

2.2.5 Department for Transport's Business Plan

The previous coalition government's vision for transport is also one that encourages growth, but is greener, safer and improves the quality of life in our communities. The government's transport priorities and key actions in order to deliver this national vision are set out within the DfT's Business Plan[7], which is updated annually. There is a focus on improving road safety, reducing congestion and pollution and making changes at a local level; priority 5 in particular outlines the need to 'invest in the strategic road network to promote growth and address the congestion that affects people and businesses, and continue to improve road safety'.

This ambition is echoed within the DfT Action for Roads[8] paper, which sets out a vision for the future of the road network. The economic importance of strategic roads is highlighted, and an emphasis placed on the need for greater investment to upgrade existing roads, address bottlenecks and open up new opportunities for growth. It states the need for key A roads to become corridors of opportunity and upgraded to a new 'expressway' standard or widened to three lanes to increase capacity.

Investment in such routes is to be prioritised in accordance with the Highways England's RBSs, with a focus on:

- High standards, with route and junctions selected to give a high quality of journey, and with the capacity to handle strategic traffic
- Introducing technology, to better manage traffic and to provide more information to motorists
- Safety near motorway standard, closing the gap between expressways and the very safest roads
- Good maintenance a top priority, with problems dealt with at an early stage

2.3 Regional and local policy and guidance

2.3.1 The Greater Cambridge Greater Peterborough Local Enterprise Partnership

The Localism Act provided the power to abolish Regional Spatial Strategies and with that the East of England Plan, which previously set out the region's targets for housing, economy, transport and environmental challenges. Local Enterprise Partnerships (LEPs) have taken on Regional Development Agencies' role in this process, with Cambridgeshire forming part of Greater Cambridge Greater Peterborough (GCGP) LEP.

Their vision is for a transport network that is 'fit for this economically vital high growth area that helps to facilitate sustainable growth and enhance economic prosperity and enables efficient movement of goods and people'. Proposals to deliver this ambition are set out within GCCP LEP's recently released Strategic Economic Plan (SEP)[9], which outlines how Local Growth Fund funding will be used to renew the physical and intellectual capital of the GCGP LEP area. One of the key priority areas identified within the SEP includes enhancing transport connectivity.

The SEP identifies that improving east west rail links and access along the A428, A47 and A14 will enhance economic growth opportunities and connectivity with Milton Keynes, Oxford, Luton and Bedford and the east coast ports. It is highlighted throughout the report that the A428 had seen a 43% increase in traffic since 2001, the highest growth of any trunk road in Cambridgeshire. The stretch of the A428 between the A1 and the A1198

[6] HM Government, 2010. *Decentralisation and the Localism Bill: an essential guide.* http://www.communities.gov.uk/documents/localgovernment/pdf/1793908.pdf
[7] DfT, 2013. *Business Plan 2013-15* http://transparency.number10.gov.uk/business-plan/11
[8] DfT, 2013. *Action for Roads. A network for the 21st century*. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/212590/action-for-roads.pdf
[9] GCGP LEP, 2014. *Strategic Economic Plan*. http://www.gcgp.co.uk/wp-content/uploads/2013/10/Delivery-Plan-2015.pdf

is the only section of the route between Milton Keynes and Cambridge that is single carriageway, and suffers from significant congestion around St Neots and at Caxton Gibbet.

2.3.2 The South East Midlands Local Enterprise Partnership

Bedfordshire forms part of the South East Midlands (SEM) LEP. The SEM is a national growth area, home to the UK's fastest growing city, Milton Keynes. Its vision is to reinforce and develop the SEM as one of them most innovative, successful and high performing economies in England by 2020. Proposals to deliver this ambition are set out within SEM LEP's recently released SEP[10]. The plans are to deliver 86,700 new homes and 111,200 new jobs accommodating an increase in population of 151,400. Two of its key objectives are to deliver infrastructure (transport, utilities and broadband) to accelerate sustainable growth in jobs, housing and investment in town centre and to secure long term and on-going funding to deliver the infrastructure plan. SEMLEP are working closely with Highways England to ensure that planned investment in the SEMLEP area can proceed to schedule. These include improvements to the Black Cat roundabout on the A1/A421.

2.3.3 Cambridgeshire Local Transport Plan 2011 – 2031: Long Term Transport Plan

Cambridgeshire Local Transport Plan[11] was published in July 2015. It is the third Local Transport Plan (LTP3) for the county, setting out policies, strategies and priorities to address transport related issues and challenges across the 15 year period to 2031. The LTP3 is focused on achieving the following eight objectives:

- To ensure that the transport network supports sustainable growth and continued economic prosperity
- To improve accessibility to employment and key services
- To encourage sustainable alternatives to the private car, including rail, bus, guided bus, walking and cycling, car sharing and low emission vehicles
- To encourage healthy and active travel, supporting improved well-being
- To make the most efficient use of the transport network
- To reduce the need to travel
- To minimise the impact of transport on the environment
- To prioritise investment where it can have the greatest impact

Across the county, major growth is planned in the period to 2031, with over 72,000 new dwellings needed to meet the predicted demand for housing for current and new residents of the area. Within the plan, it emphasises that there are a number of areas on the strategic and primary route network that require measures to be introduced for capacity reasons, one of which is the A428. As such, their plan identifies that improvements are to be made to the A428 Caxton Gibbet to Black Cat in order to deliver their transport strategy.

2.3.4 Emerging Local Plans and existing Core Strategies

The A428 passes through the local planning authorities of Huntingdonshire and Central Bedfordshire. At the time of writing this report, emerging Local Plans were at various stages of development. These, however, in conjunction with adopted Core Strategies, set out the vision and spatial strategy for each region.

The Huntingdonshire District Council LDF Core Strategy (September 2009) states that in St Neots and Little Paxton, there are plans for up to 2,650 homes, 25 ha of employment and 9,000m^2 retail space by 2026. It also identifies that in order to deliver to this, improvements will be needed to the three roundabouts on the A428 and other traffic management measures to mitigate the impact of development related traffic arising from the Core Strategy proposals.

[10]South East Midlands Local Economic Partnership Strategic Economic Plan 2015 – 2020
http://www.semlep.com/news/2014/strategic-economic-plan-submitted-to-government/
[11] Cambridgeshire's *Local Plan 2011 – 2031 Long Term Transport Strategy*
http://www.cambridgeshire.gov.uk/info/20006/travel_roads_and_parking/66/transport_plans_and_policies/5

2.4 Recent studies and consultation

2.4.1 Felixstowe to the Midlands Route Based Strategy Evidence Report April 2014

The Felixstowe to Midlands RBS forms part of Highways England's response to Alan Cook's report A Fresh Start for the Strategic Network[12]. The RBS was one of the first to be released due to the routes importance as part of a strategic national corridor and known issues, and was informed by consultation with key stakeholders. The report highlights that the A428 between St Neots and Cambridge routinely experiences major delays at its junction and links during peak periods. It also highlights the routes importance, linking the Port of Felixstowe to the A1, M1 via the A421 and Milton Keynes, the largest growing city in the UK.

The report states that proposals to substantially expand St Neots during the life of the Local Plan will significantly add to the pressure on the route which already experiences severe and frequent congestion, with peak hour speeds of between 31mph and 40mph.

Other issues identified in the report include lack of technology such as overhead gantries, lane specific signals and driver information signs, lack of provision for cyclists and lack of alternative routes during incidents and maintenance.

2.4.2 London to Leeds (East) Route Based Strategy Evidence Report April 2014

The section of the A1 between junctions with the A428 (Wyboston) and A421 (Black Cat) also fall within the London to East Leeds RBS. The report states that three of the top 10 least reliable links between London and Leeds (on both the A1 and M1) fall either side of the Wyboston and Black Cat junctions and are as follows:

3rd: A428 Wyboston to A421 Black Cat junction;

6th: A428 Wyboston to A421 Black Cat junction; and

7th A421 Black Cat junction to A603 Sandy junction.

In addition to this, the Black Cat junction lies 69th in the national safety rankings (1 being the worst safety record) on the strategic road network 2009 to 2011. The report states that improvements to Black Cat roundabout would provide a major opportunity for improved east west links between Cambridgeshire and Milton Keynes. Although short term improvements to increase capacity at the roundabout (to widen the approaches, installation of signals) has received pinch point funding, longer term additions are likely to be required in order that the A421/A1/A428 corridor operates efficiently with increases in demand resulting from traffic growth.

2.4.3 A428 Route Strategies OAR and SOBC (AECOM, 2014)

Following the outcomes of Highways England's RBS studies a number of problem bottlenecks on the SRN were highlighted as being in need of improvement. The A428 between Black Cat and Caxton Gibbet was one of the locations highlighted.

AECOM was commissioned to produce a high level OAR and SOBC for potential improvements on the A428 between Black Cat and Caxton Gibbet roundabouts. These documents were reviewed as part of the first step in this study process.

The following evidence was presented to show the problems and issues on the A428:

- The Black Cat, Wyboston, Barford Road, Cambridge Road and Caxton Gibbet junctions were identified as having capacity issues by the Highways Agency (now Highways England)
- The route as a whole was identified having safety and maintenance issues by Highways England

[12] Cook, 2011. *A Fresh Start for the Strategic Network.* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/4378/strategic-road-network.pdf

- The A428 between Wyboston and Caxton was identified by Highways England as having peak hour speeds of less than 40mph with link delays in the top 20% nationally
- The A428 was identified by Highways England as one of the least reliable journey time sections nationally.
- Black Cat roundabout has been identified as having a safety problem (69th highest number of accidents nationally)
- The A428 between Wyboston and Caxton was identified as being within the top 25% of highway links nationally for casualties per billion vehicle miles
- Stakeholders identified flooding issues along the A1 between Black Cat roundabout and Wyboston

A number of policies that support improvements to the A428 were noted, including the Cambridgeshire County Council Local Plan, The Greater Cambridge and Peterborough Strategic Economic Plan, the South Cambridgeshire Local Plan and the Huntingdonshire District Local Plan alongside a high level summary of environmental and legal constraints. The key constraints at the junction are the following:

- The East Coast Mainline runs near the route
- There are numerous residential and commercial buildings along the route
- The Wyboston Lakes surround the route near St Neots
- The route passes across the flood plain of the River Great Ouse

However, it was also noted that there an improvement will offer several opportunities, including removing traffic from sensitive woodland areas, moving traffic away from residential buildings, resolving long standing community severance issues, and creating a new cycle path along the route.

It was also noted that forecast growth in the vicinity of the scheme was likely to exacerbate the existing problems and issues on the route with a number of key development sites nearby. This is despite the completion of the A14 Cambridge to Huntingdon improvement

The following objectives were generated for any improvement at the junction:

- Reduce existing and future levels of delay and congestion
- Support significant levels of planned growth expected in the area
- Address current road safety issues
- Minimise environmental impact on sensitive receptor(s)

3. Current situation

3.1 Introduction

This chapter describes the current situation in the A428 study area. It considers the demographics of the area, the current travel demand and level of service, and the current opportunities and constraints which would affect any transport interventions.

The chapter is structured under the following sub-headings:

- Land use and demographics
- Transport network
- Route performance
- Environment
- Constraints and opportunities

3.2 Land use and demographics

3.2.1 Land use

The A428 corridor provides a strategic link between the A421, A1, A14, M11, linking Cambridge with Bedford via smaller towns including St Neots and Camborne.

Cambridge is located at the eastern end of the A428 and to the east of the M11. Cambridge has become the heart of high-technology industries for software and bioscience companies. Cambridge science and business parks are located to the north-east of the town. Smaller industrial areas are present across the town, including Clifton Road Industrial Estate near Cambridge rail station.

Bedford is located to the west of the A428 further along the A421. The major employment and industrial land use is broadly located in the near vicinity of the A421, including Elm Farm and Woburn Road Industrial Estates.

St Neots is one of the largest and fastest growing towns in Cambridgeshire with a population of 31,165 in 2011. It has undergone two major expansion schemes in the last 10 years including 1,250 new homes at Love's Farm. The town is bounded to the west by the A1 and predominantly to the south by the A428. The major employment site is adjacent to the Wyboston junction in the south-west of the town.

Cambourne is a new settlement on the A428, 9 miles east of Cambridge. It is the largest settlement in South Cambridgeshire and is home to South Cambridgeshire District Council and Camborne Business Park.

The study area used for the demographic analysis in this chapter is defined by a 50 kilometre buffer around this A428 corridor. The demographic data is also compared against data for the east of England region, and for England as a whole. These regions are outlined in Figure 3.1.

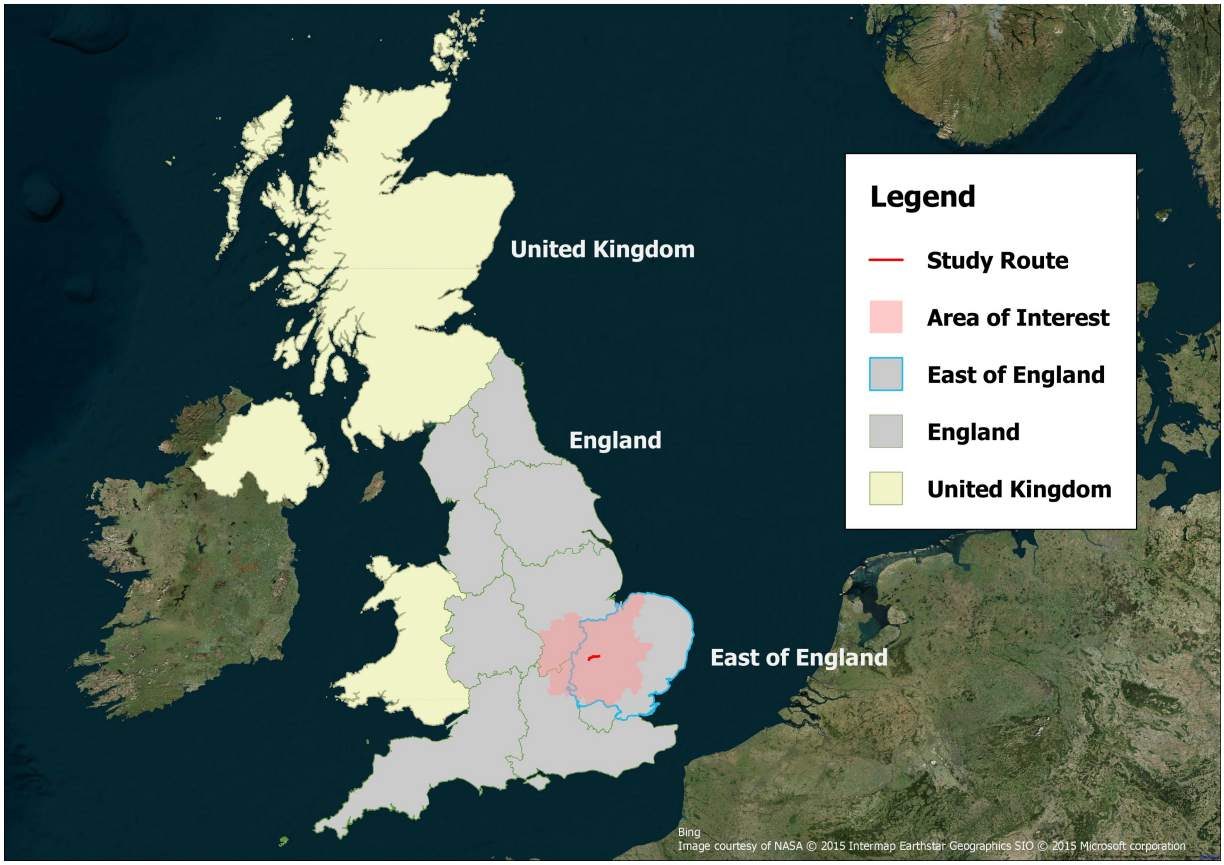


Figure 3.1: Study catchment area and A428 section route

3.2.2 Population

There are numerous population centres near the A428, the closest being St Neots and Cambourne which are located at either end of the A428 study corridor. Other large centres such as Milton Keynes, Cambridge, Northampton, Peterborough, Luton, Bedford and Huntingdon are also within the study catchment area as shown in Figure 3.2. The 2011 Census showed that the study area had a total population of 4,350,000 people.

Recent growth of the City of Cambridge has increased its population to approximately 123,900 people in 2011. Bedford Borough has a higher population that is also increasing, from 148,100 in 2001 to 163,900 in 2014. The local towns of St Neots and Camborne are home to 31,165 and 8,000 residents respectively.

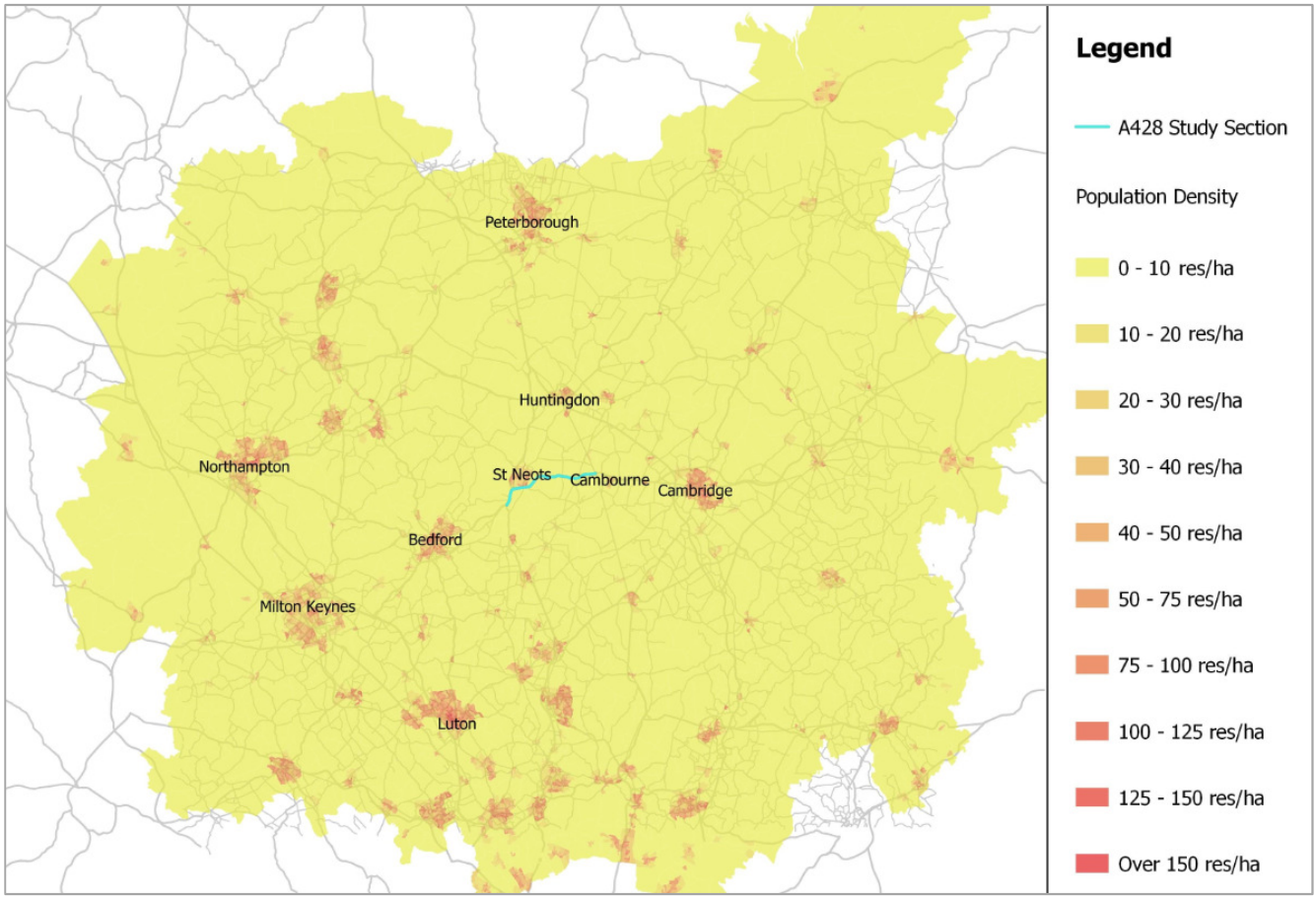


Figure 3.2: Population density in study catchment area

3.2.3 Car availability

The number of households with access to a car / van has been examined from 2011 census data. As shown in Figure 3.3, 76% of households in the study area have access to one or more vehicles. This is in line with the average for England (74%), but lowers than for the east of England region (81%).

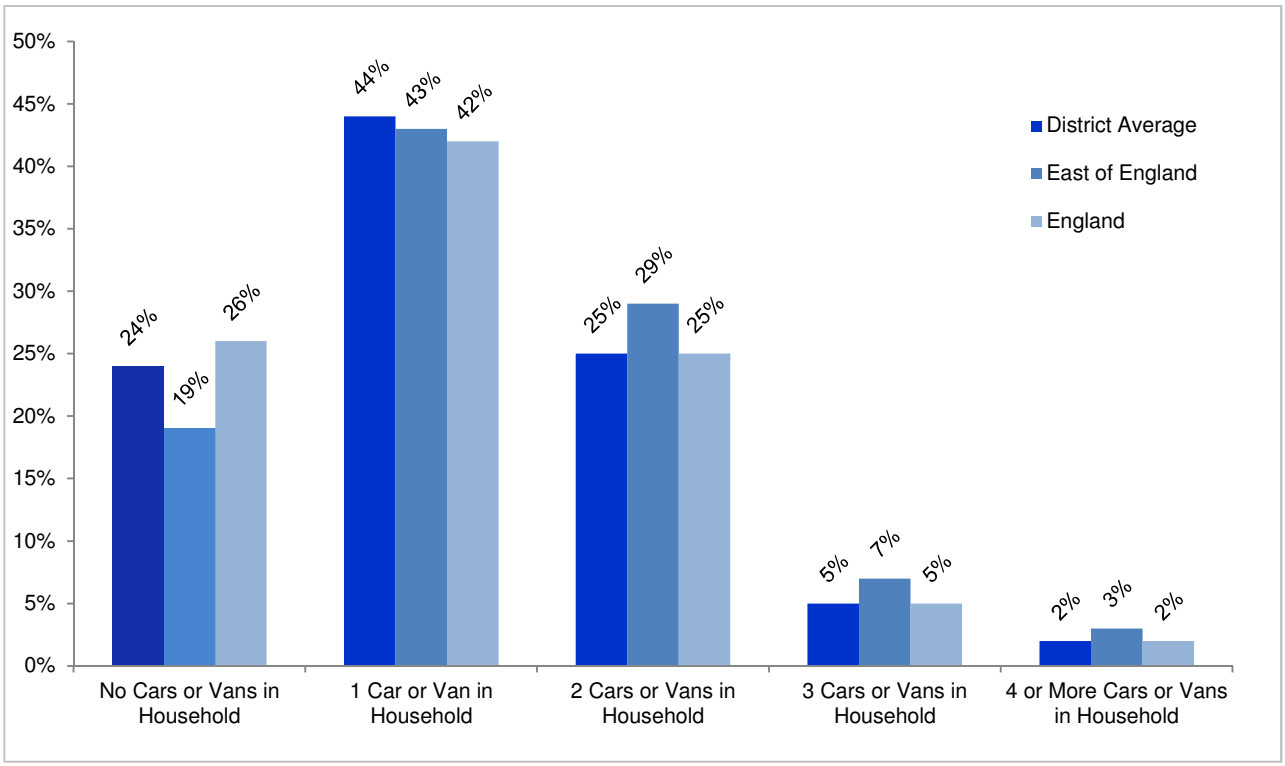


Figure 3.3 : Car or van ownership

There are a higher proportion of residents in employment in the study area compared with the east of England region and England as a whole. A total of 45% of working age residents in the study area travel to work in a car (either as a driver or passenger) while 7% commute using public transport. The statistics for the east of England region are very similar to those for the study area. The corresponding proportions for England as a whole are 40% traveling by car and 11% using public transport.

Mode of travel	Study Area	East of England	England
All public transport	7%	8%	11%
Work from home	3%	4%	3%
Taxi/motorcycle/other	1%	1%	1%
Driving a car or van	41%	41%	37%
Passenger in a car or van	4%	3%	3%
Bicycle	4%	2%	2%
On foot	8%	7%	7%
Not in employment	32%	33%	35%

Table 3.1: Method of travel to work

The average distance travelled to work by the study area residents is 16.3 kilometres, which is higher than the national average (14.9 kilometres). Table 3.2 illustrates that 42% of workers in the study area travel less than five kilometres to work.

Mode of travel	Study Area	East of England	England
Less than 2km	21%	17%	17%
2km to less than 5km	21%	15%	18%
5km to less than 10km	11%	13%	17%
10km to less than 30km	20%	23%	21%
30km to less than 60km	6%	9%	5%
60km and over	6%	4%	3%
Work mainly at or from home	9%	11%	10%
Other	7%	9%	8%
Average distance (km)	16.3	17.3	14.9

Table 3.2: Distance travelled to work

3.2.4 Economy

The scheme is located within the GCGP LEP and provides a key connection between it and the SEM LEP. Thus, the SEPs of both of the LEPs have been reviewed to establish a baseline of the local economy.

The GCGP area is one of the UK's fastest growing and most dynamic areas and makes a strong contribution to UK in the form of £30 billion gross value added (GVA) per annum. However, transport constraints represent a key challenge to supporting housing and employment growth and continued economic prosperity.

The GCGP see many of the constraints which inhibit business and housing growth are:

- road and rail 'bottlenecks' causing congestion and unreliable journey times
- limitations on the capacity of the rail network
- barriers to the delivery of housing for local workers
- limited public transport in rural areas
- east-west connectivity across the LEP area, and beyond
- potential for mode shift towards sustainable travel modes which are not fully realised
- access issues in relation to Stansted and Luton Airports as well as Heathrow and Gatwick airports

High house prices and lack of affordable housing has led to more people travelling further to work, with the average length of commute greater than the national average. Across the GCGP area, access to employment, education and services remains a real challenge without a car, especially in the more rural areas outside of the cities and market towns.

The GCGP area is forecast to experience significant population growth over the next twenty years. For large parts of the area this represents a continuation of past trends; for example, population growth in Cambridgeshire from the 2001 Census to 2011 was faster than in any other English County. Additionally, Peterborough saw the largest population growth nationally of any city over the past 20 years. The GCGP area's economic strengths and related population growth have led to significant and continued pressure for growth over recent times.

The A428 forms an east west link between the GCGP LEP and the cities of Bedford and Milton Keynes which are in the SEM LEP. The SEM LEP features many different industries such as high performance technology, manufacturing and advanced technology, pharmaceutical and healthcare and the creative and cultural sector. Examples of key businesses include Nissan, AstraZeneca, Jordans/Ryvita, Carlsberg, Vinci, Kier and BAE

Systems. Silverstone, the home of the British F1 Grand Prix is also located within the SEM LEP, as well as Cosworth who are based in Northampton.

The SEM LEP is located within the 'innovation' triangle which is formed by the university centres of Oxford, Cambridge and London. These, as well as other universities within the SEM LEP all offer businesses with a local pool of talented, skilled graduates, attracting businesses in to the area. Therefore, the area has a strong track record of growth and ambitious plans to deliver 87,000 new homes by 2021.

3.3 Transport network

3.3.1 Highway network

The focus of this study is formed by a section of the A1 from Black Cat roundabout to Wyboston Junction, and a section of the A428 from Wyboston Junction to Caxton Gibbet roundabout. This section of the A428 is the only remaining single carriageway section of the route between Felixstowe and the M1 at Milton Keynes.

There are a number of junctions on the route and only one grade separated junction at Wyboston between the A1 and the A428. There are a number of priority junctions along the single carriageway section of the route and five roundabouts at Black Cat, Wyboston, Barford Road, Cambridge Road and Caxton Gibbet. Of these, Black Cat roundabout (which forms the interchange between the A1 and the A421) has recently been improved as part of Highways England's Pinch Point Programme to alleviate problems at the junction, however, it is recognised that the improvements are not a long term solution.

The A1 connects London with Edinburgh. It is the main link between the south and north of the study area, passing through Stevenage, Huntingdon and Peterborough among others. The A428 is a major road in central and eastern England. It links the cities of Coventry and Cambridge providing a connection via the county towns of Northampton, Milton Keynes and Bedford.

These sections of the A1 and A428 perform important functions at the strategic, regional and local levels as summarised in Table 3.3.

The A428...	
Strategically	• Forms a nationally important corridor between South Midlands and east coast ports • Provides a western access to Cambridge for HGVs
Regionally	• Links the major regional centres along the route • Provides for the distribution of goods and services • Alternative route to other national routes
Locally	• Forms the St Neots bypass • Provides the only means of access to some communities along the route, farmlands and woodlands

Table 3.3: Functions of the A428

3.3.1.1 Route standard

Throughout this 17km section, there are two changes in width, variations in geometry, access, lighting and lay-by provision. Such characteristics, in combination with the high traffic volumes, are widely cited to result in congestion on the network and increased delays following an incident, which impact journey time reliability and network resilience. In addition there are safety concerns with breakdowns, recovery and emergency vehicle access, in particular where compliant cross sectional carriageway components are not provided, such as hardstrips / hardshoulders.

Horizontal alignment and sight stopping distance

The majority of the horizontal radii along the length of the alignment do not meet the 'Desirable Minimum'[13].Whilst relaxations are permitted, sufficient widening in the vicinity of or on the immediate approach to junctions is required in order to accommodate Desirable Minimum Sight Stopping Distances (SSD).

The requirements for stopping sight distances (SSD) have evolved. Direct accesses and lay-bys are now both classified as junctions and are therefore subject to SSD requirements. There are a number of direct accesses and lay-bys along certain sections of the A428 corridor that do not meet the current SSD requirements under the DMRB. '[14] These include the following locations:

- A1 northbound near School Lane and Kelpie Marine
- A1 both directions just south of Black Cat Roundabout
- A428/A1 link road northbound (vegetation)
- A428 between B1040 and North East Farm

Generally SSD at these locations is restricted due to lack of verge width or presence of mature vegetation on the verges. In addition, connector road abutments and oncoming traffic, level differences and direct accesses (including bus stops) can obscure visibility.

Whilst for the majority of the A428 corridor the lane widths appear to be compliant, there are deficiencies in hardstrip and hardshoulder provision, on the A1 part of the route.

Junctions and direct access

Along the A428 there are junctions with other major routes, including the A1 and other A and B Roads, as well as many local roads. All major junctions have been allocated numbers in a similar manner to those of motorway junctions, and primarily consist of grade separated interchanges with 2 at-grade major / minor junctions outside of St Neots (A1/A428 interchange). There is one traffic signalled at-grade roundabout (Black Cat), two roundabouts without traffic signals and nine give-way junctions.

The frequency of junctions is variable throughout the corridor. In certain locations junctions are spaced very close together, which has resulted in sub-standard on/off slips or limited weaving lengths e.g. B1040, Abbotsley Road. This is likely to affect the mainline resilience, with an increased susceptibility to congestion and delays during peak periods. Turbulence between the merge and diverge may also impact upon operational performance.

There are sections of the A428 that retain at-grade accesses to residential, commercial and agricultural properties. There are 49 private accesses and three service stations with direct frontage access. The proximity and number of access points along the route is significant, and likely to generate considerable interference with mainline throughput. This creates the potential for increased incidents, thus impacting upon network resilience and journey time reliability, and is ultimately a hindrance and unsafe on a high speed (60mph) road.

Lay-bys

There are currently 17 lay-bys on the scheme route which vary in terms of provision and layout. Concern has been raised with regard to both the standard and siting (including issues associated with positioning, frequency, SSD) of this provision.

Assessment indicates that the level and standard of provision of lay-bys on the A428 is well below that required by current departmental standards. Typical concerns include:

- Layout issues
- No physical kerbed segregation island
- No through lane provided within lay-bys

[13] DMRB, 2002. *TD 9/93 Highway Link Design*. http://www.dft.gov.uk/ha/standards/dmrb/vol6/section1/td993.pdf
[14] DMRB, 2002. TD 9/93 Highway Link Design. http://www.dft.gov.uk/ha/standards/dmrb/vol6/section1/td993.pdf

- Location on horizontal radius, restricting SSD
- Desirable Minimum SSD not achievable on the immediate approach to the start of the lay-by
- Poor merge taper layout
- Length of lay-by

3.3.1.2 Asset condition

A review of the asset condition of the A1 and A428 between Black Cat roundabout and Caxton Gibbet roundabout has been undertaken making use of available data sources that are maintained by Highways England to monitor and review the condition of the SRN.

The review has identified that the majority of the current pavement surfacing material will have exceeded its anticipated lifecycle by 2020, and will require replacement.

The review has also highlighted minor maintenance interventions of structures along the A428, with the most significant intervention being the River Great Ouse Crossing which has been identified as having high priority. The River Great Ouse crossing has a cracking concrete bearing pad which requires monitoring at regular intervals, severely deteriorated expansion joints, delamination and spalling at abutments that require repair, and blocked gullies.

No issues were identified with geotechnical, lighting, vehicle restraint system (VRS), fencing, signage or technology through analysis of available data.

3.3.1.3 Technology

Existing technology provision on the A428 between the Black Cat Roundabout (A1) and Caxton Gibbet (A1198) comprises the following:

- Three traffic measurement equipment (TME) traffic counting sites
- A single automatic number plate recognition (ANPR) camera site providing journey time information, which is located on the A428 at the junction with the A1 (Wyboston)

There are no signals, closed circuit television (CCTV) or emergency telephones on the A428 between the A1 and A1198.

There is no National Roads Telecommunications Services (NRTS) communications network on the A428. Communications to traffic count and ANPR sites are provided over GSM/GPRS networks.

As reported in the RBS evidence reports, stakeholders have identified the need for greater provision of driver information along the A428 between Wyboston and Caxton Gibbet and the need for intelligent technology along the whole route.

3.3.2 Public transport

St Neots Railway Station is located on the East Coast Main Line (ECML) and provides rail services between London Kings Cross and Peterborough every 30 minutes. Journey times are between 53 and 69 minutes to London Kings Cross and 25 minutes to Peterborough. No east west rail services currently operate in the study area.

There are limited bus services operating along the A428. The X5 service operated by Stagecoach runs between Cambridge and Oxford via St Neots, Bedford and Milton Keynes. It operates every 30 minutes during the middle of the day, and up to every 15 minutes during the morning and evening peaks.

Two National Express services also operate along the A428 at a frequency of once per day: the 305 service between Liverpool and Clacton-on-Sea and the 314 service between Southport and Cambridge. Both of these services stop at Bedford, St Neots, Cambourne and Cambridge.

3.3.3 Non-motorised users (NMU)

The A428 / A1 study area provides some facilities for non-motorised users. These include various footways, crossing facilities and underpasses. Part of the Sustrans national cycle network (NCN) route 12 runs on Roxton Road parallel to the section of A1 between Black Cat and Wyboston.

The RBS evidence reports identified that the Black Cat, Wyboston and Caxton Gibbet roundabouts, and the A428 link between Wyboston and Caxton Gibbet have issues regarding cycling and pedestrian provision. Stakeholders highlighted the poor NMU provision between the Phoenix Park Triangle and the Eaton Socon urban area.

3.4 Route performance

3.4.1 Travel patterns

The pattern of commuting trips in the study area was analysed, based on 2011 Census journey to work information. Table 3.4 shows the daily commuting trips made by car, taxi or motorcycle, between several major towns and cities in the relative proximity of the A428.

The most significant movements are from St Neots to Bedford and fom St Neots to Cambridge which are most likely to use sections of the A428 between Black Cat and Caxton Gibbet.

	Bedford	Cambridge	Cambourne	Huntingdon	Luton	Milton Keynes	Northampton	Peterborough	St Neots
Bedford		165	32	132	n/a	n/a	n/a	154	280
Cambridge	77		n/a	n/a	49	49	17	n/a	120
Cambourne	25	n/a		n/a	7	6	2	n/a	42
Huntingdon	59	n/a	n/a		12	57	n/a	n/a	n/a
Luton	n/a	41	7	12		n/a	n/a	35	20
Milton Keynes	n/a	82	2	64	n/a		n/a	79	53
Northampton	n/a	28	0	n/a	n/a	n/a		n/a	17
Peterborough	100	n/a	n/a	n/a	105	126	n/a		n/a
St Neots	455	571	97	n/a	47	139	30	n/a	
	*Impact on A1**								
	*Impact on A428**								
	*Impact on A1 and A428**								

Table 3.4 : Daily commuting trips using study corridor

An ‘n/a’ indicates no movement was recorded between each urban areas. Assumptions have been made with regard to the potential for certain journeys to utilise particular sections of the road network.

3.4.2 Traffic volumes

Observed traffic count data and HGV percentages have been obtained from the Highways England Traffic Database System (TRADS). Data was obtained for the 2014 calendar year.

For locations where observed traffic data was not available, it was taken from the A14 traffic model (CHARM). This model was developed to support the A14 Cambridge to Huntingdon improvement scheme, and has a base year of 2014. Further information on the use of this model is provided in Appendix B.

The traffic data is summarised in Figure 3.4 and Table 3.5. Traffic volumes are provided as peak hour flows and as Annual Average Daily Traffic (AADT). AADT represents the average number of vehicles passing a given point on a road each day. The percentage of HGVs is also provided.

The A1 between Black Cat roundabout and Wyboston junction has on average 28,000 vehicles per day in each direction. The A428 between Wyboston and Caxton Gibbet has between 8,500 and 14,000 vehicles per day in each direction.

Figure 3.4 shows that annual average PM peak hour flows are higher in volume than the AM peak hour flows on both the A1 and A428. The percentage of HGVs on each section varies between 10% and 15%. This is broadly in line with the national rural trunk roads typical average of 10.3%.

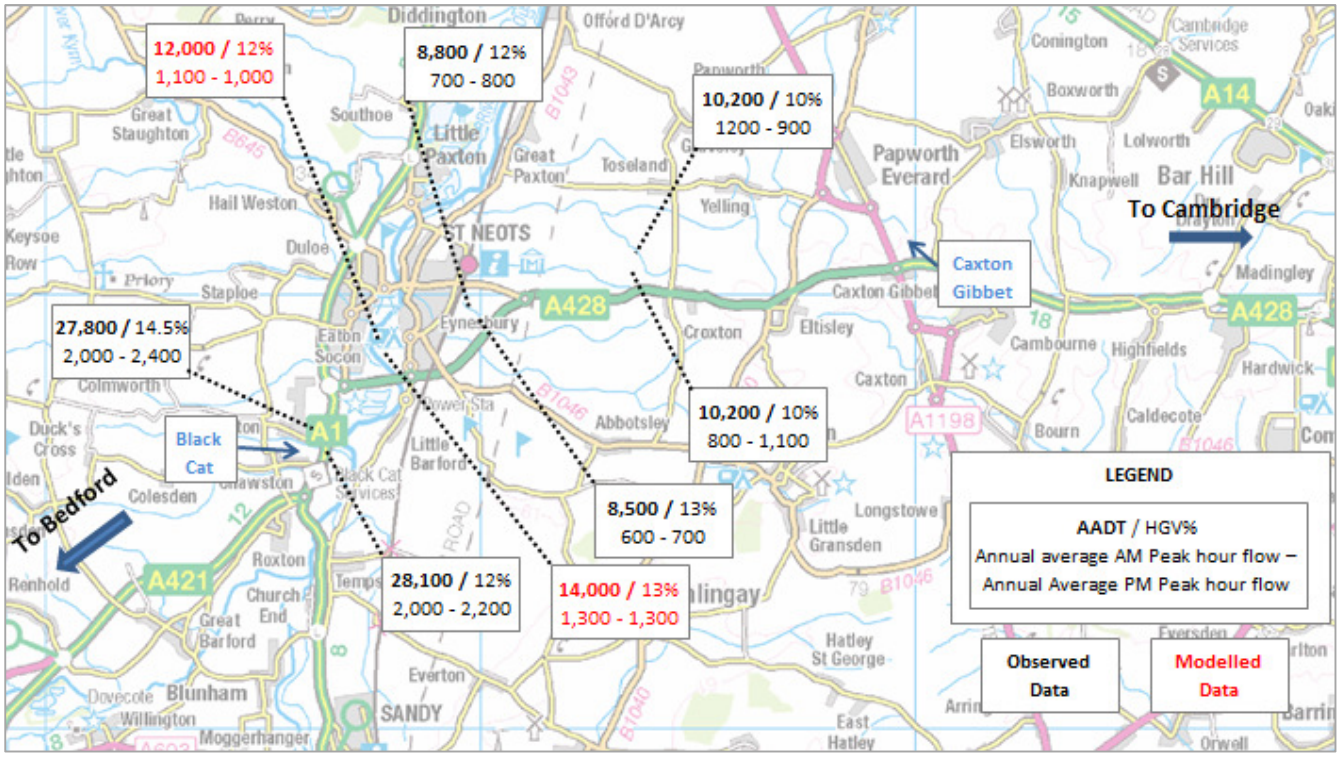


Figure 3.4 : A428 / A1 traffic volumes and HGV percentages **Value factored to 2014 from 2012 counts*

From	To	Source Data	AADT (2014)	HGV% (AADT)	AM peak hour flow	PM peak hour flow	AM Peak Hour	PM Peak Hour
Eastbound								
Black Cat Roundabout	Wyboston Junction	Observed Data	27,800	14.5%	2,000	2,400	7-8am	5-6pm
Wyboston Roundabout	Barford Rd Roundabout	A14 Traffic Model	12,000	12%	1,100	1,000	8-9am	5-6pm
Barford Rd Roundabout	Cambridge Rd Roundabout	Observed Data	8,800	12%	700	800	7-8am	5-6pm
Cambridge Rd Roundabout	Caxton Gibbet Roundabout	Observed Data	10,200	10%	1,200	900	7-8am	5-6pm
Westbound								
Caxton Gibbet Roundabout	Cambridge Road Roundabout	Observed Data	10,200	10%	800	1,100	7-8am	5-6pm
Cambridge Rd Roundabout	Barford Rd Roundabout	Observed Data	8,500	13%	600	700	7-8am	4-5pm
Barford Rd Roundabout	Wyboston Roundabout	A14 Traffic Model	14,000	13%	1,300	1,300	8-9am	5-6pm
Wyboston Junction	Black Cat Roundabout	Observed Data	28,100	12%	2,000	2,200	7-8am	5-6pm

Table 3.5 : A428 traffic volumes and HGV percentages **2012 count factored to 2014*

3.4.3 Capacity and capability

The volume to capacity (V/C) ratios have been estimated for the study corridor using the volume of traffic on the road divided by the theoretical capacity of the road link. This provides an indication of how close to capacity a road is operating at. A value of 1 would represent a road operating at maximum theoretical capacity.

Existing A428 and A1 carriageway capacities have been estimated using guidance outlined in DMRB. This is documented in Appendix B. Traffic volumes have been based on either observed or modelled peak hour data, as provided in Table 3.5.

The calculated V/C ratios are provided in Table 3.6. Several sections of the route are operating close to or above their theoretical capacity. The worst performing section of the A428 is between Barford Road and Wyboston. This is estimated as being above capacity in both the AM and the PM peaks in the westbound direction while it approaches capacity in the AM peak in the eastbound direction. The section of the A428 between Cambridge Road roundabout and Caxton Gibbet is also estimated to be operating above capacity in the AM peak in the eastbound direction while it is approaching capacity in the PM peak westbound.

Section	Peak Hour Volume		V/C Ratio		DMRB ref. capacity (veh/hr)
	AM	PM	AM	PM	
Eastbound					
A1: Black Cat roundabout to Wyboston Junction	2,000	2,400	0.54	0.65	3,700
A428: Wyboston Junction to Barford Road roundabout	1,100	1,000	0.92	0.83	1,200
A428: Barford Road roundabout to Cambridge Road roundabout	700	800	0.58	0.67	1,200
A428: Cambridge Road roundabout to Caxton Gibbet	1,200	900	1.00	0.75	1,200
Westbound					
A428: Caxton Gibbet roundabout to Cambridge Road roundabout	800	1,100	0.67	0.92	1,200
A428: Cambridge Road roundabout to Barford Road roundabout	600	700	0.50	0.58	1,200
A428: Barford Road roundabout to Wyboston Junction	1,300	1,300	1.08	1.08	1,200
A1: Wyboston Junction to Black Cat roundabout	2,000	2,200	0.54	0.59	3,700

Table 3.6 : A428 traffic volume and capacity **2012 count factored to 2014*

The route also has several low-capacity junctions along its length within a short distance of each other. Previous analysis undertaken in support of development sites in the area identified that the roundabouts at Wyboston, Barford Road and Caxton Gibbet would be operating at, or close to, their theoretical maximum capacity by 2015. Table 3.7 shows the predicted ratio of flow to capacity (RFC) in the PM time period each of these roundabouts which indicates that each junction is operating either beyond or close to their maximum theoretical capacity.

Junction	RFC
Wyboston Roundabout	**0.85**
Barford Road Roundabout	**0.88**
Caxton Gibbett	**1.13**

Table 3.7 : A428 junction ratio flow to capacity

3.4.4 Journey times

Trafficmaster data provided by Highways England has been analysed to estimate current journey times for the A428 corridor between Caxton Gibbet roundabout and Black Cat roundabout. Trafficmaster data provides individual vehicle speeds obtained via GPS devices fitted to both private and commercial vehicles. Trafficmaster data is able to provide a large sample of vehicle speeds for the A428 which can be analysed.

Average AM peak (7am - 10am), inter-peak (11am - 12pm), PM peak (4pm - 7pm) and off peak (9pm-10pm) time periods between September 2013 and May 2014 were used in the journey time analysis.

Table 3.8 shows the average journey times along the full route of the A1 and A428 between Black Cat roundabout and Caxton Gibbet roundabout in both directions. This table shows that the AM and PM journey times take significantly longer, in both directions, than off-peak journey times.

From	To	AM	IP	PM	OP
Black Cat Roundabout	Caxton Gibbet Roundabout	20m 34s	14m 39s	16m 58s	12m 54s
Caxton Gibbet Roundabout	Black Cat Roundabout	20m 16s	14m 37s	17m 13s	13m 01s

Table 3.8 : A428 route journey times

Figure 3.5 and Figure 3.6 plot the cumulative travel time between the A421/A4280 junction on the A421 (west of Black Cat) and Scotland Road roundabout on the A428 (east of Caxton Gibbet). These figures present journey time information for a broader area of network than the route analysed in Table 3.7.

The figures show that the AM and PM peak period journey times take significantly longer, in both directions, than in the inter-peak and off-peak time periods.

Figure 3.5 shows that in the eastbound direction there are significant delays on the A421 approaching Black Cat roundabout in the PM time period. This is likely to be due to commuter traffic travelling northbound along the A1 from the south of Black Cat roundabout. The figure also shows that there is significant congestion between Barford Road roundabout and the B1040/ St Ives Road junction during the AM time period. This is likely to be due to traffic travelling along the A428 into Cambridge.

Figure 3.6 shows that in the westbound direction there is significant congestion on the A428 at Caxton Gibbet roundabout in all time periods and on the A1 approaching Black Cat roundabout in the AM time period. However, recent improvements to Black Cat roundabout may have now improved this issue.

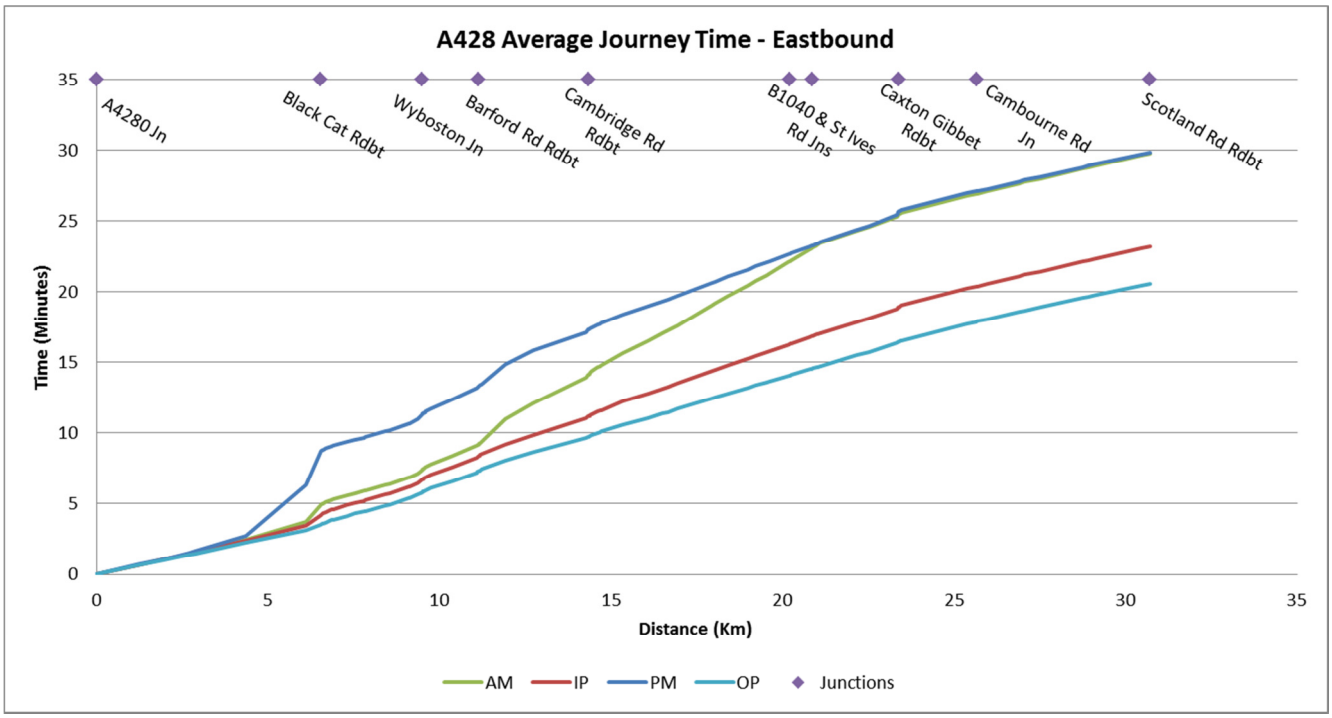


Figure 3.5 : Eastbound from Scotland Rd roundabout to A421/A4280 junction

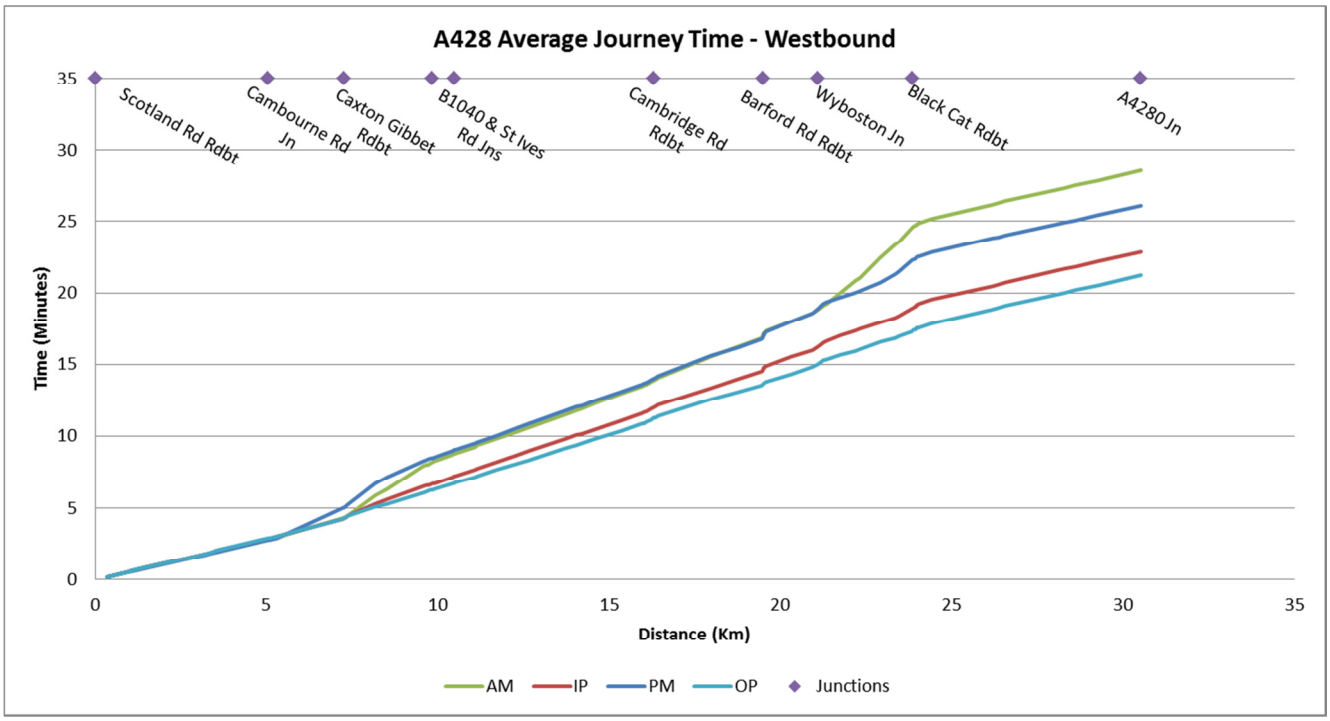


Figure 3.6 : Westbound from Scotland Rd roundabout to A421/A4280 junction

3.4.5 Speed analysis

Trafficmaster data has also been used to calculate average link speeds. These speeds have been analysed to illustrate in greater detail the performance of junctions along the route. Figure 3.7, Figure 3.8 and Figure 3.9 show the average AM (7am-10am), IP (11am-12pm), and PM (4pm – 7pm) peak time periods between September 2013 and May 2014.

The figures clearly show that the average speeds on the single carriageway sections of the route are significantly lower than on the dual carriageway sections on either side of the area of interest (A421 to the west of Black Cat roundabout and the A428 to the east of Caxton Gibbet roundabout).

The AM speeds are particularly low, especially on the approaches to Black Cat and Caxton Gibbet roundabouts. Over half of the eastbound journey between Wyboston Junction and Caxton Gibbet has an average speed of below 30mph.

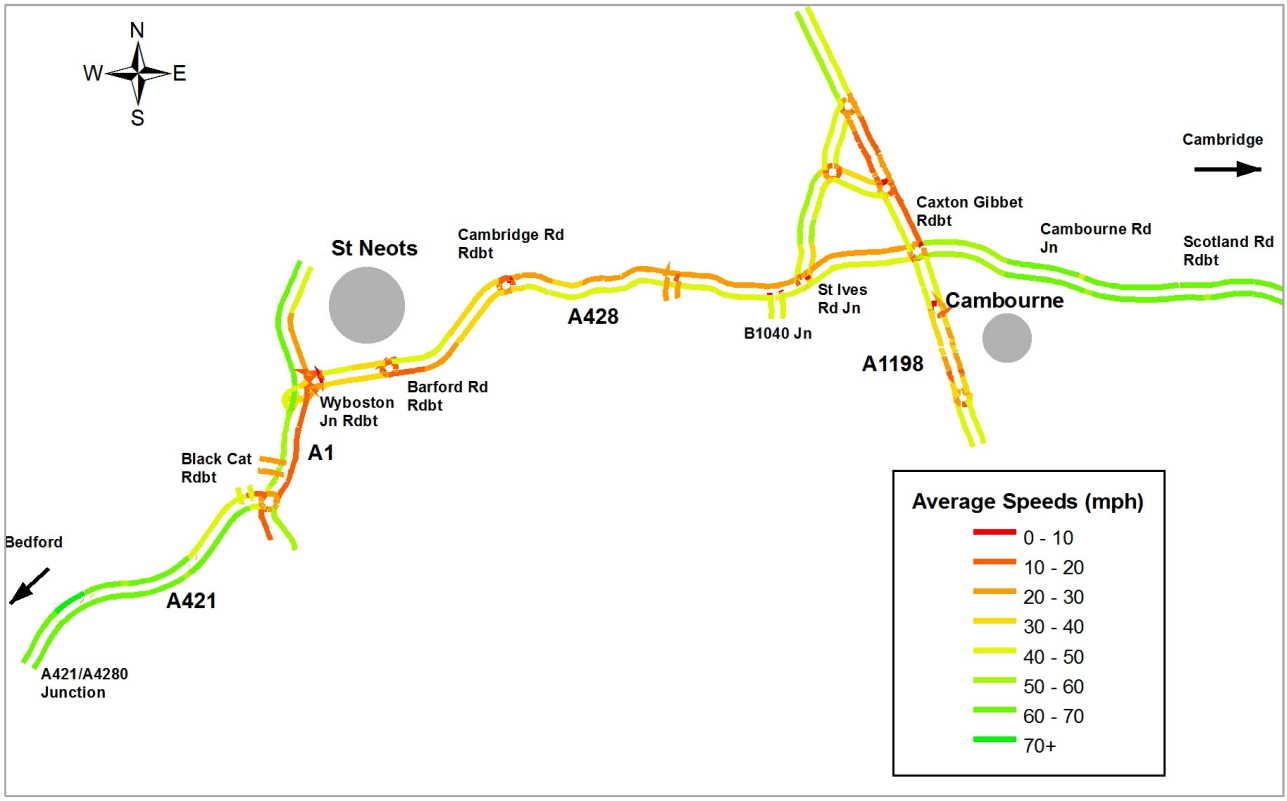


Figure 3.7 : AM average traffic speeds (mph)

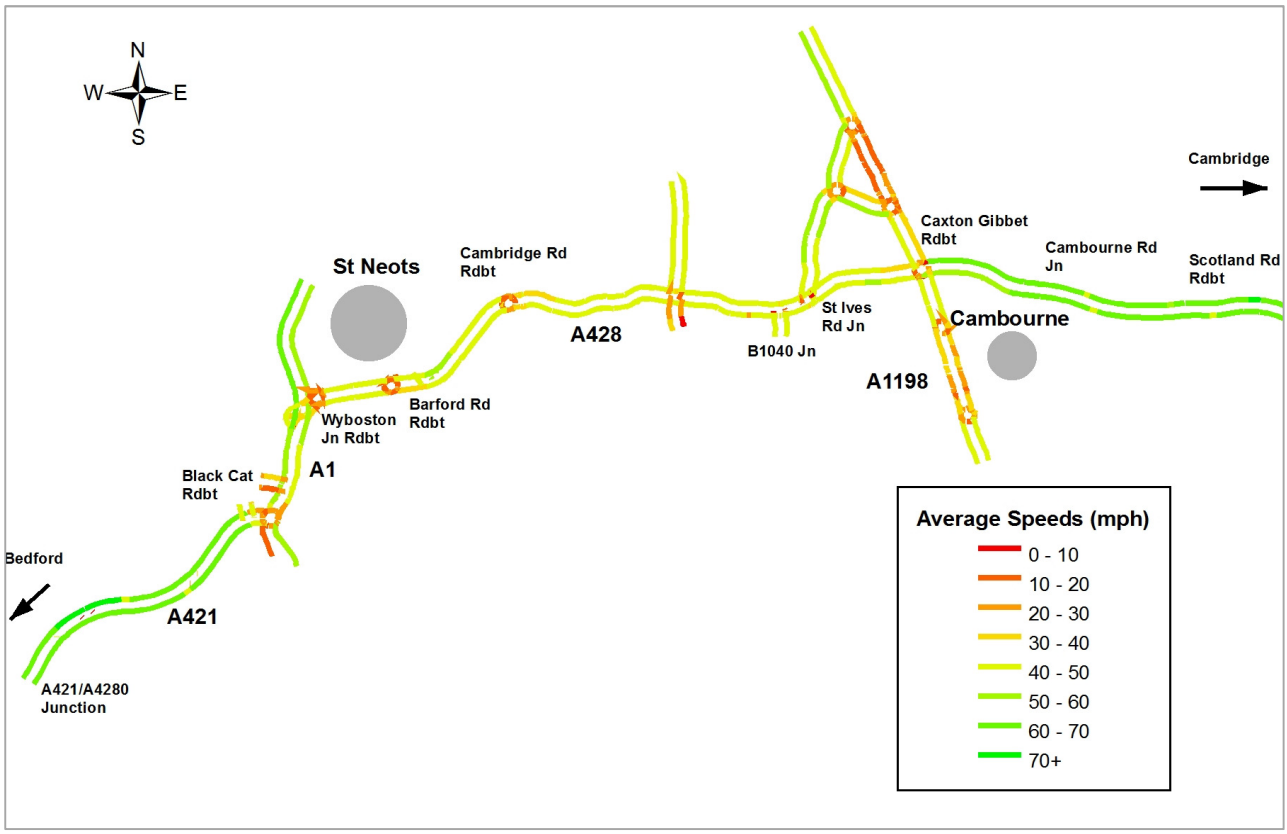


Figure 3.8 : IP average traffic speeds (mph)

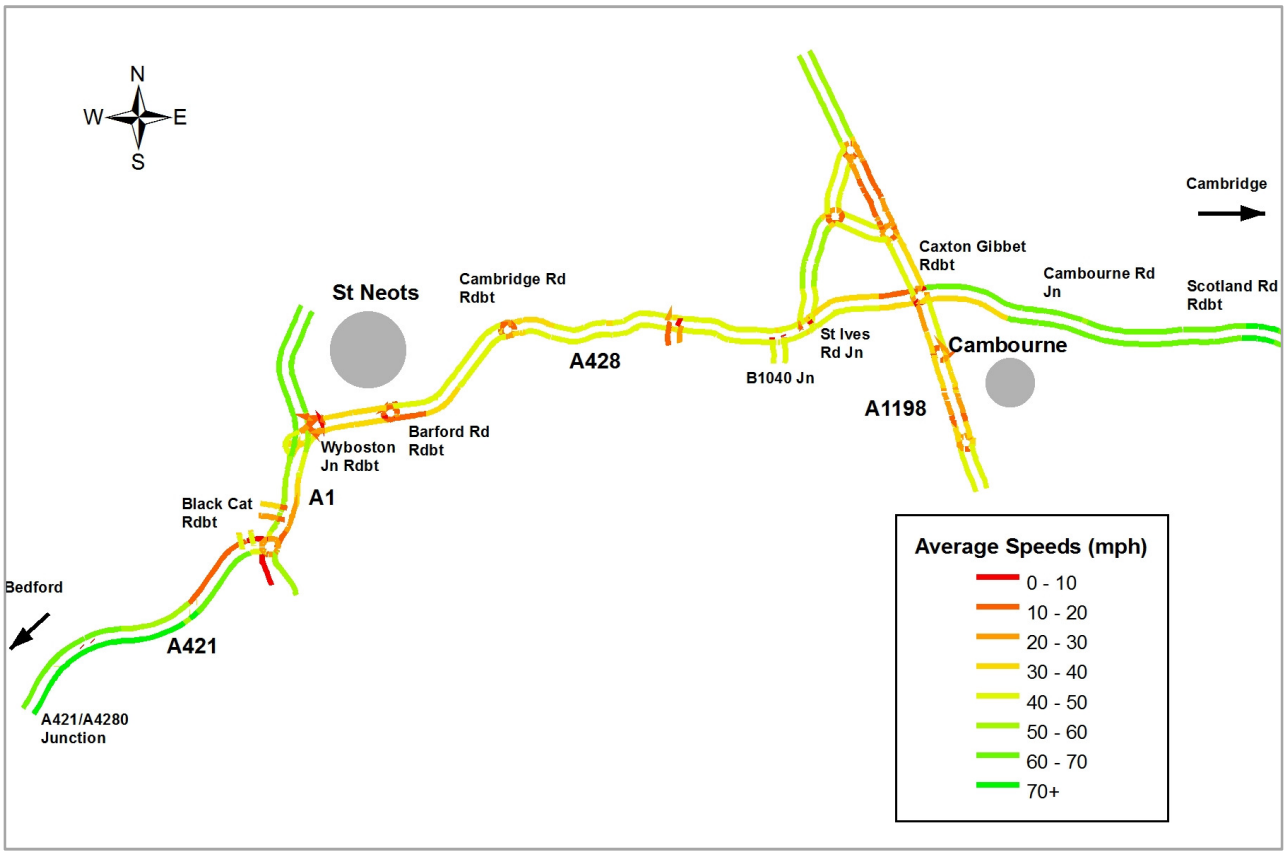


Figure 3.9 : PM average traffic speeds (mph)

In addition to the average speed, all individual speed observations were used to build a speed distribution profile for each link. This shows the proportion of observed vehicles travelling at or below speeds given in increments of 10mph.

This speed distribution is shown in Table 3.9. It can be seen that the majority of vehicles on dual carriageways in the peak hours travel at more than 60mph (with the exception of the A1 between Black Cat roundabout and Wyboston junction). On single carriageway sections of the A428, a high proportion of vehicles travel at less than 40mph, especially between Wyboston and Barford Road roundabouts.

The A428 Eltisley, Caxton Gibbet Improvement Review by URS identified that significant queues develop at Caxton Gibbet roundabout in the AM peak on the A428 in the eastbound and westbound directions, as well as on the A1198 southbound. It is noted that in the AM peak eastbound queues on the A428 can extend to the Eltisley junctions, and in the PM peak, westbound queues can extend to the Cambourne Junctions.

From	To	Dual / Single C'way	Average Speed (mph)				% time below speed in peak hours (mph)				
			AM	IP	PM		<70	<60	<50	<40	<30
Eastbound											
A421/A4280 Jn	Black Cat Roundabout	Dual	59	63	45		56%	29%	19%	16%	13%
Black Cat Roundabout	Wyboston Roundabout	Dual	49	48	48		99%	86%	43%	19%	8%
Wyboston Roundabout	Barford Rd Roundabout	Single	38	43	36		100%	99%	95%	73%	45%
Barford Rd Roundabout	Cambridge Rd Roundabout	Single	37	47	45		100%	96%	75%	48%	38%
Cambridge Rd Roundabout	A428/B1040 W Jn	Single	28	44	41		100%	99%	79%	39%	16%
A428/B1040 W Jn	A428/B1040 E Jn	Single	25	44	42		100%	99%	79%	32%	20%
A428/B1040 E Jn	Caxton Gibbet Roundabout	Single	24	41	30		100%	98%	80%	48%	34%
Caxton Gibbet Roundabout	Cambourne Rd Roundabout	Dual	61	61	63		78%	32%	3%	0%	0%
Cambourne Rd Roundabout	Scotland Rd Roundabout	Dual	67	67	69		60%	13%	1%	0%	0%
Westbound											
Black Cat Roundabout	A421/A4280 Jn	Dual	66	66	69		60%	24%	9%	1%	0%
Wyboston Roundabout	Black Cat Roundabout	Dual	18	42	34		99%	91%	67%	54%	43%
Barford Rd Roundabout	Wyboston Roundabout	Single	36	39	32		100%	100%	97%	75%	50%
Cambridge Rd Roundabout	Barford Rd Roundabout	Single	29	44	32		100%	99%	86%	67%	54%
A428/B1040 W Jn	Cambridge Rd Roundabout	Single	43	46	44		100%	98%	78%	26%	8%
A428/B1040 E Jn	A428/B1040 W Jn	Single	44	47	45		100%	98%	73%	19%	7%
Caxton Gibbet Roundabout	A428/B1040 E Jn	Single	44	47	42		100%	98%	75%	27%	12%
Cambourne Rd Roundabout	Caxton Gibbet Roundabout	Dual	56	58	38		79%	48%	21%	11%	6%
Scotland Rd Roundabout	Cambourne Rd Roundabout	Dual	67	66	68		55%	12%	1%	0%	0%

Table 3.9 : Average vehicle speeds and distribution of speeds

3.4.6 Journey time reliability

Day to day peak period journey time reliability along the A428, A1 and A421 has been measured in terms of the buffer index (BI). This index represents the time a traveller should allow in addition to the average travel time to ensure on time arrival 95% of the time. A higher BI value reflects a more unreliable journey time. Additional information regarding the BI as a measure of travel time reliability is presented in Appendix D.

The BI has been calculated for each road segment using Trafficmaster data recorded during normal working days from September 2013 to May 2014. For this analysis, AM and PM peak cover the same time periods as previous analysis in this section.

Peak period travel time reliability is illustrated visually in Figure 3.10 and Figure 3.11.

The reliability analysis shows that peak period travel along the A428 is relatively unreliable, with a significant number of segments having a BI of above 40%. Journey times are more unreliable in the eastbound direction in the morning, and in the westbound direction approaching Black Cat roundabout in the PM. This is likely to be due to commuters travelling to and from Cambridge during peak periods.

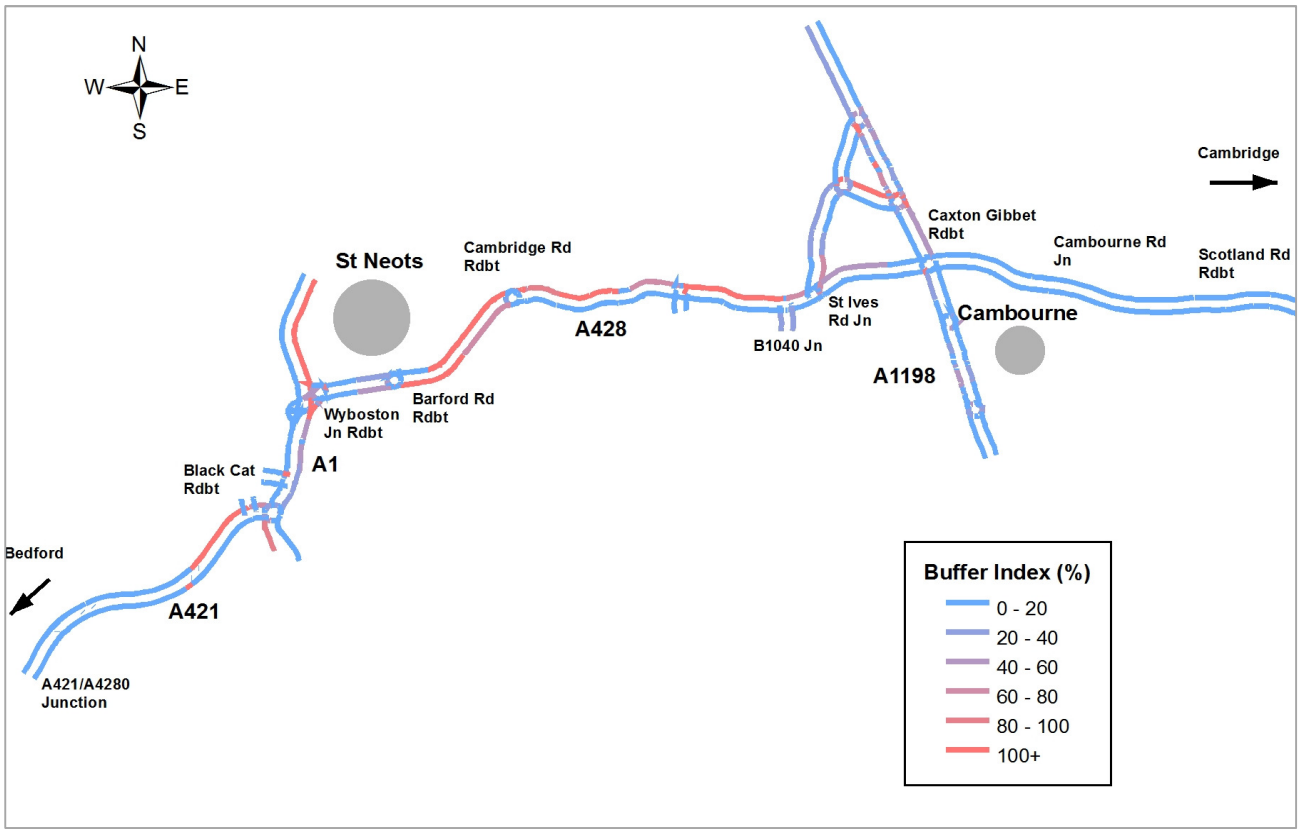


Figure 3.10 : A428 AM buffer index

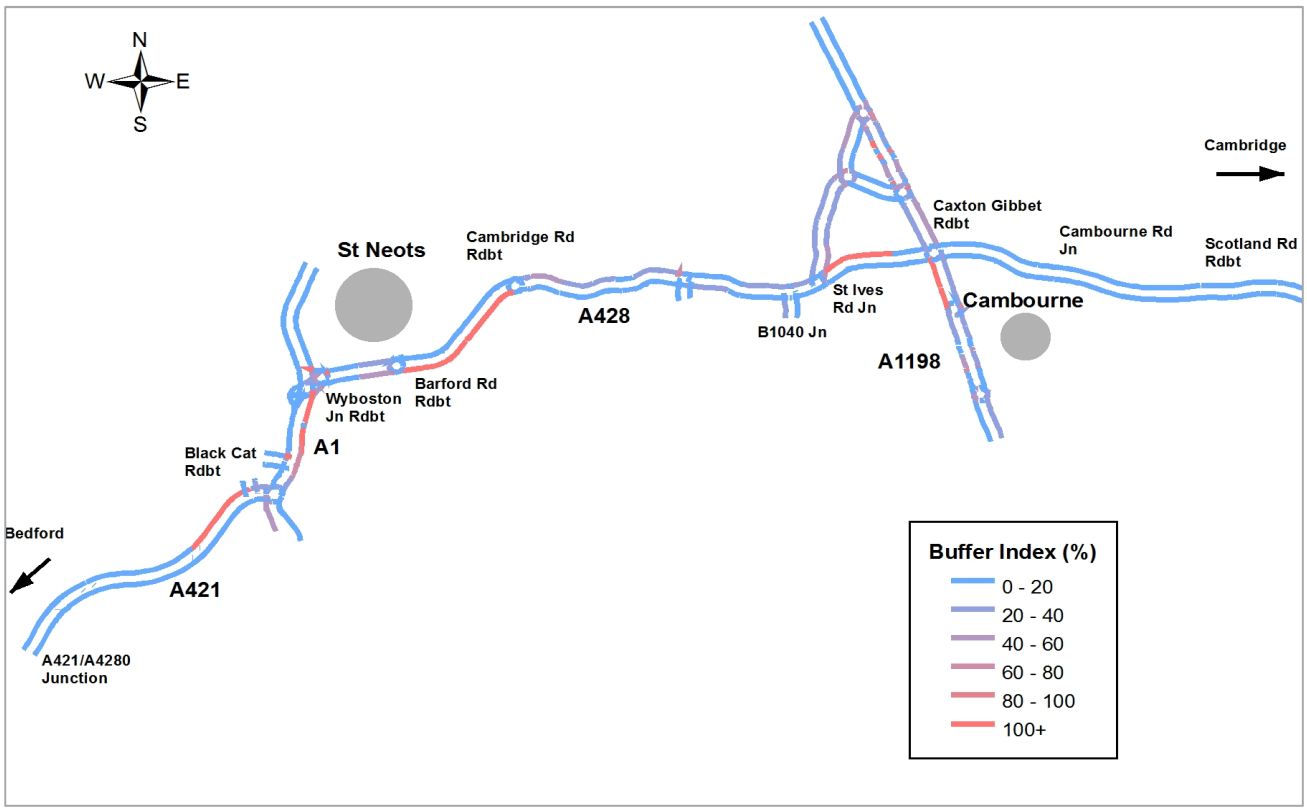


Figure 3.11 : A428 PM buffer index

The A428 Eltisley, Caxton Gibbet Improvement Review by URS identified that significant queues develop at Caxton Gibbet roundabout in the AM peak on the A428 in the eastbound and westbound directions, as well as on the A1198 southbound. It is noted that in the AM peak eastbound queues on the A428 can extend to the Eltisley junctions, and in the PM peak, westbound queues can extend to the Cambourne Junctions.

3.4.7 Road Safety

3.4.7.1 Collision analysis

A review of available collision data for the five years from January 2010 to December 2014 has been undertaken to help understand whether there is currently a safety problem along the study corridor and identify any potential areas in need of improvement.

For the purpose of this review the study corridor was separated into three main areas: the A1, A428 and remainder of study area. In the five year period there were 57 accidents (seven serious, 50 slight) recorded along the A1, and 100 accidents (three fatal, 20 serious, 77 slight) recorded along the A428.

The locations of the collisions have been analysed, and clusters of collisions have been identified. It is notable that there are major collision clusters at the A1/A421 Black Cat roundabout, and at Caxton Gibbet roundabout.

The average KSI rate/hmvm for the A428 for the five year period is marginally higher than the national average, however, this is skewed through a large number of KSIs occurring in 2010 compared to the rest of the assessment period with the observed KSI rates in 2011, 2012, 2013 and 2014 being below the national average.

The casualty rates for the A1 for the period are significantly higher than the national averages except in 2012. This could be explained by the presence of the large cluster site (A1/A421 Black Cat Roundabout) being located mid-way along the section. The Black Cat roundabout has previously been identified as a collision black spot by Highways England and local authorities.

There is low level of NMU collisions on the trunk road (two on A1, both of which involved pedestrian and three on A428, one of which involved a pedestrian and two involved pedal cyclists). The accidents were at separate locations, and so no pattern can be discerned. One of the pedal cycle collisions was at A428/A1198 Caxton Gibbet roundabout.

In contrast, NMU collisions account for 37 of 119 collisions on local roads, which is a high level (31%, as compared to 22.3% nationally[15]). Of these, 20 were cyclists and 17 were pedestrians. Nine of the NMU casualties/collisions occurred on the B1428, Great North Road, and a further nine at Cromwell Road, St Neots.

3.4.7.2 Incidents and Road Closures

Analysis of incident frequency along the A428 has been undertaken using historic incident data supplied by Highways England for four years between May 2010 and May 2014.

Incident types have been grouped into traffic collision, breakdown and other (e.g. planned roadworks, animal on road, fire, spillage, weather).

Presented in Figure 3.12 is the average four year incident rate per vehicle kilometres travelled (VKT) by section, also broken down by type.

From Figure 3.12 it is clear that the majority of incidents that occur within the area of interest are defined as being 'Other', which includes planned roadworks, spillages, congestion etc. The rates of incidents are higher on the A421 and the dual carriageway section of the A428 than on the single carriageway section of the A428.

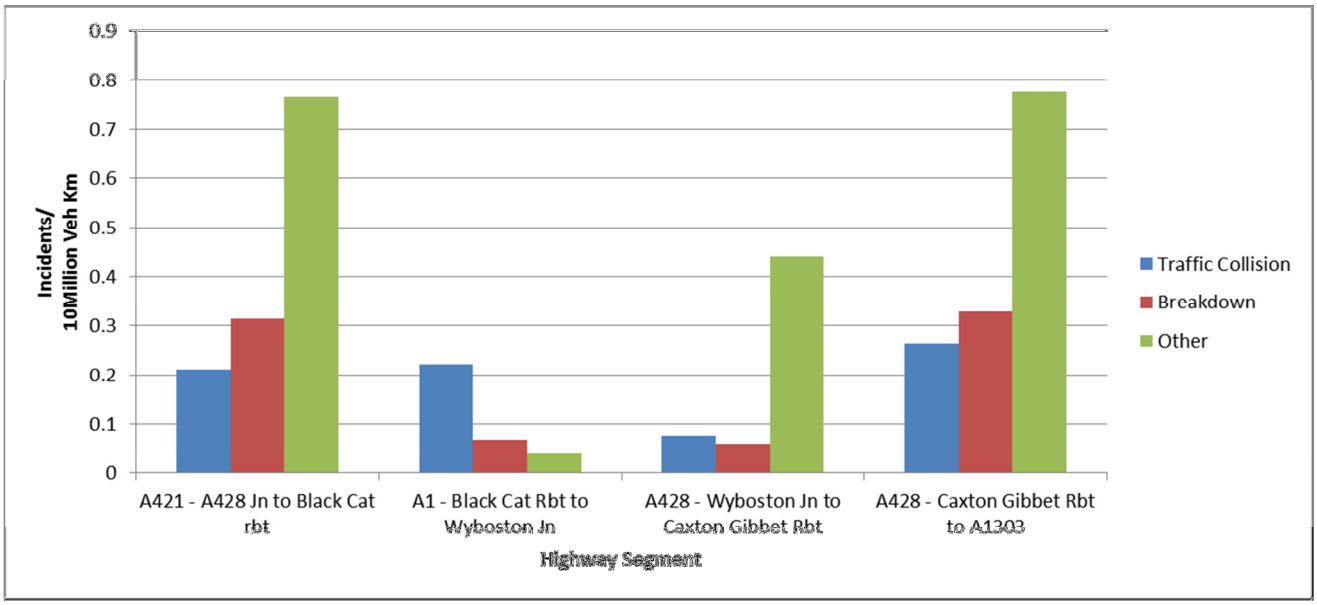


Figure 3.12 : A428 incidents per vehicle kilometres

The incident occurrence time series results, illustrated in Figure 3.13, shows that there have been a significant increase in 'other' incidents since 2012. This is likely to be due to roadworks taking place in the area. The number of breakdowns and traffic collisions have remained relatively stable between 2011 and 2013.

[15] Reported Road Casualties Great Britain: 2013 – Annual Report – Table RAS 30004
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/359311/rrcgb-2013.pdf

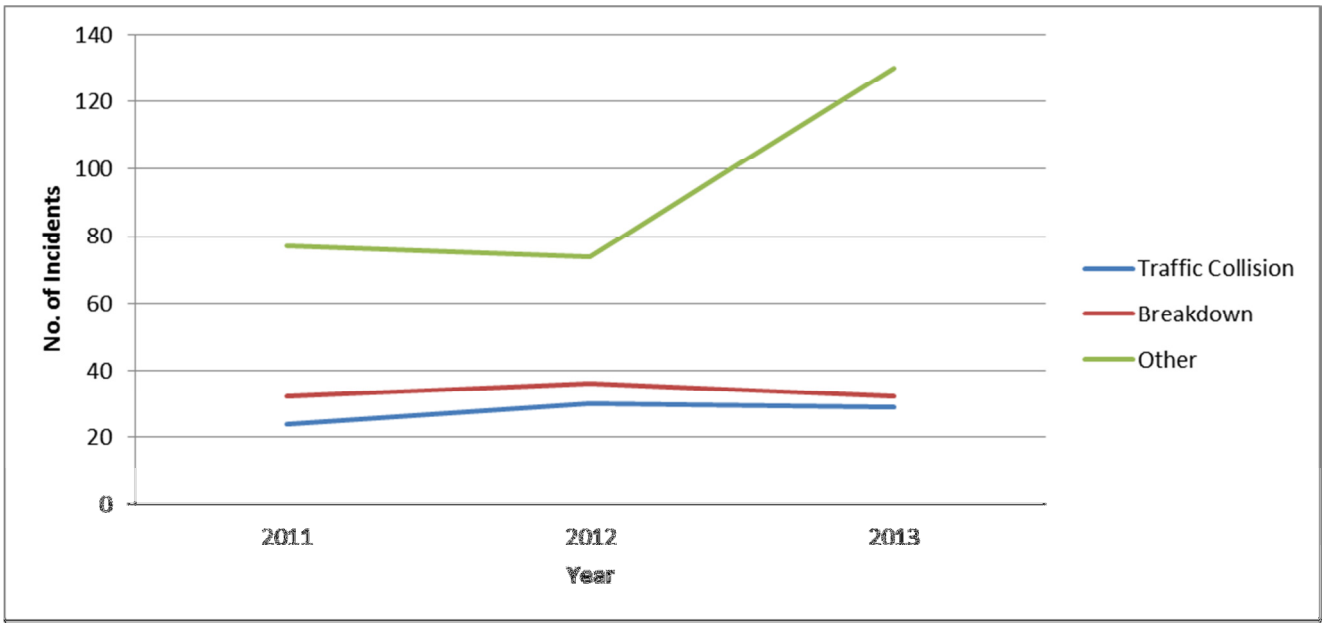


Figure 3.13 : Yearly profile of incident breakdown types

The frequency of carriageway closures between May 2010 and May 2014 has been calculated for each section, and is shown in Table 3.10. This shows that on average there are seven lane closures a year on the single carriageway of the A428. This is considerably higher than the number of carriageway closures on the A421, A1 and the dual carriageway section of the A428. The lower number of incidents on the single carriageway and higher closure rate indicates the lack of resilience on the single carriageway sections of the route when compared to the dual carriageway sections.

Highway segment	Annual average lane closures
A421:A428 Junction to Black Cat	3
A1: Black Cat roundabout to Wyboston Junction	2
A428: Wyboston junction to Caxton Gibbet roundabout	7
A428: Caxton Gibbet roundabout to Scotland Junction	1

Table 3.10 : Annual lane closure frequency

3.4.8 Public transport

Section 3.3 set out the lack of an alternative rail route for commuters along the corridor. However, there are bus services along the A428, of which the X5 bus service operated by Stagecoach offers the only realistic commuting option. Year 2011 census data shows that only 7% of commuters in the study area commute via bus compared to 11% nationally.

A comparison of travel time and availability of bus services along the corridor versus commuting by car has been undertaken to understand how appealing east-west public transport is to the general public.

Table 3.11 and Table 3.12 show the comparison for commuters heading to Cambridge from destinations to the west.

Town	Peak hour service frequency to Cambridge (buses per hour)	Scheduled travel time to Cambridge Parkside (minutes)	Estimated Journey time by car in the AM peak (minutes)
Bedford	2	74	45-100
St Neots	2	43	40-75

Table 3.11 : Commuting to Cambridge Parkside via bus services vs road (AM peak)

Town	Peak hour service frequency to Cambridge (buses per hour)	Scheduled travel time to Cambridge Parkside (minutes)	Estimated Journey time by car in the PM peak (minutes)
Bedford	2	74	45-90
St Neots	2	43	30-45

Table 3.12 : Commuting to Cambridge Parkside via bus services vs road (PM peak)

Bus services become a more preferable choice for commuting when journey times are quicker than commuting by car. However, in this case the estimated journey time by car is comparable to the scheduled journey time by bus in both the AM and PM periods. Therefore commuting by bus does not offer a significant advantage over commuting by private car.

Table 3.13 and Table 3.14 show the comparison for commuters heading to Bedford from destinations to the east.

Town	Peak hour service frequency to Bedford (buses per hour)	Scheduled travel time to Bedford (minutes)	Estimated Journey time by car in the AM peak (minutes)
St Neots	2	44	24-40
Cambridge	3	69	50-75

Table 3.13 : Commuting to Bedford via bus services vs road (AM peak)

Town	Peak hour service frequency to Bedford (buses per hour)	Scheduled travel time to Bedford (minutes)	Estimated Journey time by car in the PM peak (minutes)
St Neots	2	36	24-40
Cambridge	3	69	50-85

Table 3.14 : Commuting to Bedford via bus services vs road (PM peak)

3.5 Environment

The study corridor passes through a landscape that contains a number of sensitive environmental features. These are described in brief below.

3.5.1 Air quality

There are no air quality management areas (AQMAs) within the study area. The nearest AQMA is located in St. Neots' High Street, which is declared for nitrogen dioxide (NO_2) and operated by Huntingdonshire District Council[16] (Defra, 2015).

3.5.2 Cultural heritage

There are no world heritage sites (WHS) within 5 kilometres of the study area, or registered battlefields within 1 kilometre. There are 11 scheduled monuments within the study area. These include seven within 500 metres of the existing road:

- Tempsford Bridge, part of the A1 crossing the River Great Ouse south of the Black Cat junction.
- Moated enclosure and associated building platforms, The Lane, Wyboston, located approximately 230 metres from the A1.
- Deserted village at Wintringham, located approximately 500 metres from the A428 east of St Neots.
- Deserted village (site of) at Weald, located approximately 200 metres from the A429 east of St Neots.
- Croxton deserted medieval village and 16th-17th century garden remains, located adjacent to the A428 in Croxton.
- Moated site at Pond Farm, located approximately 250 metres from the A428 in Eltisley.
- Moated site at Pastures Farm, located approximately 450 metres from the A428 south-west of the Caxton Gibbet junction.

Croxton Park Grade II* registered park and garden is located adjacent to the A428. This park consists of a mid-18th Century house and walled garden set within an early 16th Century deer park, and contains the Croxton deserted medieval village scheduled monument.

There are over 70 listed buildings within the study area. The majority of these are clustered in St. Neots, and Croxton, Eltisley, and Wyboston villages. Of these, there are 14 Grade II listed buildings within 100 metres of the existing road. There is also a conservation area in the town of St. Neots which ends south of the town adjacent to the A428. Conservation areas seek to preserve or enhance the historic character or appearance of towns[17].

3.5.3 Landscape

There are no areas of outstanding natural beauty (AONB) or national parks within 5 kilometres of the study area. The study area is not within any greenbelt.

The study area falls within the Bedfordshire and Cambridgeshire Claylands national character area (NCA). This area is a broad lowland plateau dissected by shallow river valleys, including the River Great Ouse and its tributaries. The predominant land use in the NCA is commercial and arable farming; however, there are also a diverse range of semi-natural habitats, including national and international designated sites which support a wide range of species[18].

The majority of the study area falls within the Northern Wolds landscape character area (LCA). This is a historic landscape with a dispersed pattern of villages, with little modern development and many medieval features. The landscape is also characterised by its well vegetated valleys and open ridges and plateaus[19].

[16] Department for Environment Food & Rural Affairs. (2015). AQMAs Interactive Map. http://uk-air.defra.gov.uk/aqma/maps. Accessed 14th May 2015
[17] Huntingdon District Council. (2006). St Neots Conservation Area Character Assessment
[18] Natural England. (2014). NCA Profile: 88 Bedfordshire and Cambridgeshire Claylands (NE555). http://publications.naturalengland.org.uk/publication/5091147672190976?category=587130. Accessed 5th May 2015
[19] Bedfordshire County Council and Bedford Borough Council. (2007). Bedford Borough Landscape Character Assessment. Land Use Consultants

3.5.4 Ecology and nature conservation

There are no special protection areas (SPA), special areas of conservation (SAC), national nature reserves (NNR), or Ramsar sites located within 5 kilometres of the study area. There is one SAC designated for bats within 30km of the study area. Eversden and Wimpole Woods SAC lies 8.5 kilometres to the south east of the study area and is primarily designated for *barbastelle* bats (*Barbastella barbastellus*).

There are no sites of special scientific interest (SSSI) within the study area. The nearest site is Elsworth Wood SSSI located approximately 1.8 kilometres north-east of Caxton Gibbet junction.

There are no local nature reserves (LNR) within the study area. The non-designated Begwary Brook Nature Reserve is located to the north-east of the Black Cat roundabout. A Bedford Borough Council County wildlife site is located around a section of the River Great Ouse, centred on the Wyboston leisure park[20].

The study area includes a number of biodiversity action plan (BAP) priority habitat including deciduous woodland, wood pasture and parkland, coastal and floodplain grazing marsh, lowland fens, and young trees. Eltisley wood, an ancient replanted woodland, is located approximately 1 kilometre from the A1 south of Eltisley (NGR TL 272588). There is the potential for legally protected and notable species in the study area.

3.5.5 Geology and soils

The underlying geology of the area is composed of mudstone, siltstone and sandstone, with alluvium and river drift deposits near the River Great Ouse and diamicton till deposits north of the A428[21]. The ground in the area is mainly composed of lime-rich loamy and clayey soils with impeded drainage; around the River Great Ouse the soils are freely draining slightly acid loamy soils and loamy and clayey floodplain soils with naturally high groundwater.

In terms of hydrogeology, the study area is classed as unproductive strata, with the nearest bedrock aquifer located approximately 5.2 kilometres south-east of the Black Cat junction. The area between St Neots and the Black Cat junction is classed as a secondary A superficial aquifer. This means that there are permeable layers within the drift deposits capable of supporting water supplies at a local level. There are no groundwater source protection zones in the area[22].

The study area includes one active landfill to the north of Eltisley, off the B1040. There are historic landfill sites located in Wyboston and the Wyboston interchange.

3.5.6 Noise and vibration

Given the semi-rural location, it is likely that existing noise levels would be low within the study area. The highest noise levels are likely to be experienced at Eltisley, Croxton and Gallow Hill, where baseline noise levels are likely to be higher due to existing road traffic.

3.5.7 Effect on all travellers

There are seven footpaths and two bridleways located adjacent to the existing A428. These are located near Black Cat Roundabout; south-east of St. Neots, between Hen Brook and Wintringham; north of Weald Farm; north of Croxton Park; and north of Eltisley. The Ouse Valley Way trail runs adjacent to and crosses the Great North Road, and is a regionally important route. National Cycle Route 12 runs to the west of the Black Cat Roundabout.

The East Coast Main Line lies parallel to the A1 within open countryside to the south and east of St. Neots.

[20] Bedford Borough Council. (2008). Core Strategy and Rural Issues Plan
[21] British Geological Society. (2015). Geology of Britain Viewer. http://mapapps.bgs.ac.uk/geologyofbritain/home.html. Accessed 5th May 2015.
[22] Environment Agency. (2015). What's in your Backyard. http://maps.environment-agency.gov.uk/wiyby/wiybyController?ep=maptopics&lang=_e. Accessed 5th May 2015.

3.5.8 Community and private assets

The main land use in the area is agricultural with the majority of land being classed as grade 2 (very good) under the agricultural land classification (ALC). There is a small pocket of grade 1 (excellent) land near the Black Cat roundabout. There is no registered common land within the study area.

There are a number of commercial buildings in the study area, including: hotels at the Black Cat service area, Wyboston interchange, and near the Caxton Gibbet junction; Kelpie Marine boatyard located at Tempsford Bridge; Colmsworth business park south of St Neots; and Wyboston Leisure Park between Wyboston and St Neots.

3.5.9 Road drainage and water environment

The River Great Ouse cuts through the open countryside to the east of the Black Cat roundabout. Areas around the river are designated as flood zone 3 with a 1 in 100 chance of annual flooding from the river. The study area also contains the Hen Brook south east of St. Neots, and South Brook and Begwary Brook north of Black Cat: these are all also designated as flood zone 3. All three of these waterbodies are classified as 'moderate ecological status' with the objective of achieving 'good' status by 2027. These waterbodies are within the Upper and Bedford Ouse catchment, which forms part of the Anglian River Basin Management Plan[23]. In addition, there are numerous unnamed field drainage ditches in the study area.

The study area falls within the SWSGZ1012 surface water safeguard zone for pesticides, and is within a nitrate vulnerable zone (NVZ) for both surface waters and groundwater. An NVZ is an area of land that drains into water known to be polluted by nitrates.

3.6 Constraints and opportunities

3.6.1 Constraints

Early identification of any constraints, especially those which may be "show-stoppers", is essential to the option generation process. These constraints can be physical, legal or institutional and can affect the definition of the area of interest for any potential improvement.

A number of physical constraints along the A1 and A428 between Black Cat roundabout and Caxton Gibbet roundabout have been identified at this stage. These are outlined below:

- Housing and other development close to the A1 alignment between Black Cat roundabout and Wyboston junction.
- Bridge crossing between Wyboston junction roundabout and Barford Road roundabout.
- Bridge crossovers of the A428 between Barford Road roundabout and Cambridge Road roundabout including a railway line.
- Housing within close proximity to the current alignment between Cambridge Road roundabout and Caxton Gibbet roundabout.
- A petrol garage within close proximity to the West of Caxton Gibbet roundabout.

In addition to the constraints highlighted above, Croxton Park is designated as a Scheduled Monument, a Grade II* Registered Park and Garden and a Conservation Area. This site lies immediately south of the existing A428 and would be affected by online options and offline solutions to the south of the existing road. An offline route located to the south of the existing road is likely to have significant effects on the designated features and also on their views and settings. In addition, the villages of Croxton and Eltisley lie to the south of the existing road. These are likely to experience increased noise levels, a deterioration in air quality and significant changes to their character, setting and views from a route option to the south of the existing A428 compared to a route to the north.

Appendix E illustrates the location of the environmental constraints along the A1 and A428 between Black Cat roundabout and Caxton Gibbet roundabout.

[23] Environment Agency. (2009). River Basin Management Plan Anglian River Basin District

3.6.2 Opportunities

There are a number of opportunities that could be realised through improvements along the A1 and A428, and these are described below:

- Improve economic conditions for businesses utilising this route as part of wider east-west strategic connections between Oxford and Cambridge
- Facilitate local and regional growth in housing and employment due to additional road capacity
- Reduce queuing around Black Cat roundabout; this can have a particular impact on development close-by through reducing air quality and noise impacts
- Improve user satisfaction through improved journey time reliability, journey speeds, and pavement condition. Improvement to lay-by facilities will also assist this.
- Improve NMU facilities along the study corridor, and improve the pedestrian environment for developments close to the current alignment
- An offline solution to the north of the existing A428 would move traffic away from sensitive receptors and could result in positive effects on sensitive areas due to reduced noise levels and lower air pollution concentrations. A route to the north of the existing A428 would also provide greater distance between traffic and the designated sites, which is likely to lead to fewer stakeholder concerns and a lower risk of a significant effect to the designated sites

4. Future situation

4.1 Introduction

This chapter describes a future transport situation in the study area to provide a baseline for the development of scheme options. Policy documents and travel demand forecasts have been reviewed to identify any changes that are likely to occur in the study area, in terms of future land-use and policies, future changes to the transport system, and future travel demands and levels of service.

4.2 Planned growth and infrastructure changes

4.2.1 Planned growth

Planned growth along the A428 between Black Cat Roundabout and Caxton Gibbett has been investigated using the local plans of the local authorities in the vicinity of the route. Forecasts of the housing need and the available housing space and estimates of the number of new jobs required in each area are detailed in these plans along with information about key development sites identified by the council.

4.2.1.1 Cambridge

The 2011 census showed that Cambridge had a population of 123,900; by 2031 this is predicted to increase to 150,000. As such the need for new housing is high with large scale housing developments already underway at a number of sites in and around the city that are expected to provide over 7,000 new homes. Sites include the Trumpington Meadows, Clay Farm, Glebe Farm, National Institute of Agricultural Botany and the University of Cambridge's North West development all of which are adjacent to the M11.

Future housing needs are estimated at 14,000 new dwellings by 2031, as such there is currently a shortfall that the Cambridge Local Plan (Cambridge City Council, 2014) aims to address.

In addition to these 14,000 homes the strategic housing market assessment (SHMA) for Cambridgeshire undertaken by Cambridgeshire and Peterborough City Councils has forecast that Cambridge will require an additional 22,100 jobs between 2011 and 2031. The Local Plan seeks to deliver new employment land at six key locations in Cambridge: the area round Cambridge Station, West Cambridge, Cambridge Biomedical Campus, north-west Cambridge, Fulbourn Road and Cambridge Northern Fringe East. Development at these locations is intended to help continue the growth of the "Cambridge Cluster"; a world leader in education and research. In addition there is proposed retail and leisure development in central Cambridge (the Fitzroy/Burleigh Street/Grafton area of major change).

4.2.1.2 South Cambridgeshire

South Cambridgeshire is a largely rural district which surrounds the city of Cambridge and comprises over 100 villages, none with a population of over 8,000. The 2011 census showed that South Cambridgeshire had a population of 146,800. The SHMA forecast that there was a need for 19,000 new dwellings and 22,000 new jobs in the district.

Proposals to accommodate this housing growth that are considered the most sustainable are to develop on the edge of the city of Cambridge and the creation of a new town north of Waterbeach accommodating 8,000 to 9,000 new houses, however it is recognised that this new town is not expected to be able to deliver housing until towards the end of the plan period (2031). Other developments include proposals at Bourn Airfield (3,500 houses) and Cambourne West (1,200 houses). There are already plans for a new town at Northstowe providing 9,500 homes as outlined in the Northstowe Action Plan.

The Local Plan (South Cambridgeshire District Council, 2013) aims to maintain the role of the Cambridge area as a world leader in research, education and knowledge based industries through encouraging growth at Cambridge Science Park, Hinxton Hall, Granta Park and Peterhouse Technology park.

4.2.1.3 Huntingdonshire

Huntingdonshire is a predominantly rural in character with an area of 350 square miles. The population is currently around 160,000 people with approximately half living in the four market towns of Huntingdon, St Neots St Ives and Ramsey. The District lies within the London / Stansted / Cambridge / Peterborough Growth Area.

The Local Plan period (2001 – 2026) states that a total of 14,000 homes will be provided in Huntingdonshire. Of these, at least 2,650 homes are planned for St Neots and Paxton, as well as 25 hectares of land to be allocated for B1, B2 and B8 uses and 9000m^2 of retail use. Thus the town is to become a significant attractor of trips in the future.

4.2.1.4 Central Bedfordshire

Central Bedfordshire is a mainly rural location in the east of England and is considered to be a highly desirable place to both live and work. Much of the area has either a suburban or rural feel, with picturesque villages, hamlets and historic market towns. The largest towns are Leighton Buzzard, Dunstable, Houghton Regis, Biggleswade, Flitwick and Sandy. Central Bedfordshire covers some 716 square kilometres from Leighton Buzzard and Dunstable in the west to Sandy, Biggleswade and Stotfold in the east. Its population is currently around 264,500. The Local Plan states that between 2001 and 2031, 27,000 new dwellings and 27,000 new jobs are planned for the area up to 2031.

4.2.1.5 Bedford Borough Council

Bedford Borough Council contains the large urban area of Bedford, the adjacent town of Kempston and the surrounding villages. The Borough has a population of 163,900, of which 75% of the live in the Bedford Urban Area and the five large villages which surround it. The Local Plan states that between 2001 and 2031, 16,270 dwellings are planned.

4.2.1.6 North Hertfordshire

North Hertfordshire includes a range of settlements, including isolated rural hamlets, numerous villages, the four towns of Hitchin, Letchworth Garden City, Baldock and Royston, and large parts of the Great Ashby estate on the edge of Stevenage. It has a population of approximately 130,000.

The Local Plan states that over the period of 2011 – 2031, sufficient land is to be released for development to enable the delivery of at least 14,200 dwellings as well as over 30 hectares of employment land.

4.2.1.7 Summary

Table 4.1 below provides a summary of the future growth ambitions of Cambridge, South Cambridgeshire, Huntingdonshire, Central Bedfordshire and Bedford Borough Local Authorities and North Hertfordshire as laid out in their local plans.

Local Authority	Housing Target	Employment Target	Data Source
Cambridge City	14,000 new dwellings by 2031	22,100 new jobs	Cambridge Local Plan (Cambridge City Council), 2014
South Cambridgeshire	19,000 new dwellings by 2031	22,000 new jobs	South Cambridgeshire Local Plan (South Cambridgeshire District Council), 2013
Huntingdonshire	14,000 new dwellings, with 2650 within St Neots and Paxton	25 hectares of land to be allocated for B1, B2 and B8 uses and 9000m2 of retail use within St Neots and Paxton	Huntingdonshire LDF Core Strategy (Huntingdonshire Local Development Framework), 2009
Central Bedfordshire	27,000 new dwellings	27,000 new jobs	Central Bedfordshire Local Plan 2014
Bedford Borough	16,270 dwellings are planned	21 hectares of class B1, B2 and B8.	Bedford Borough Council Local Plan, July 2013
North Hertfordshire	14,200 dwellings	30 hectares of employment land	North Hertfordshire District Council Local Plan, 2014

Table 4.1 : Housing and employment planned growth summary

4.2.2 Highway network improvements

The upgrading of Black Cat junction was completed in spring 2015. The capacity has been increased by increasing the size of the roundabout and installing part time signals. This is seen as an interim measure prior to grade separation in the future.

Highways England is currently involved in the A14 Cambridge to Huntingdon Improvement scheme set to begin construction in 2016 at a cost of £1.5 billion. This scheme aims to widen a section of the A1 between Brampton and Alconbury and create a new bypass to the south of Huntingdon and improve the junctions with the M11 and A1 among other improvements to the local road network. This scheme is expected to relieve congestion, improve safety and the environment and to enhance economic growth.

Cambridgeshire County Council has committed to a number of improvements in order to improve transport between the A428 and Cambridge, including replacing the A10 Foxton level crossing west of M11 Junction 11 with either an underpass or overbridge. The Cambridgeshire Long Term Transport Strategy (Cambridgeshire County Council, 2014) set out the following schemes that may be required in the future:

- Cambridge orbital highway capacity
- A505 capacity improvements
- M11 capacity in Cambridge area
- M11 capacity south of Cambridge
- A14 capacity improvements east of Cambridge

Bedford Borough Council are also involved in a number of improvements near to the route, in particular the Bedford Western Bypass which links the A421 to the A428 and the A6, phase one of this work has already been completed while work on phase two started in October 2014.

4.2.3 Public Transport

Cambridge County Council, Cambridge City Council, South Cambridgeshire District Council, the Greater Cambridge Grater Peterborough Enterprise Partnership and Cambridge University have secured significant future investment in the area through a city deal. Schemes which are to be completed along the St Neots to Cambridge corridor through the city deal include:

- Segregated bus links on the A1303 or an offline alignment on the A428 and the M11
- Eastbound bus priority through the A428/A1198 Caxton Gibbet roundabout
- Provision of an outer Park & Ride on the A428 between Cambourne and A1303
- A1303 busway to serve Bourn Airfield and Cambourne

A cycling and walking network will be provided which links into the interchanges along the corridor, but that also connects the outlying villages to employment sites, such as at Cambourne and also to secondary schools in Comberton, Cambourne and further afield in Gamlingay

There are proposals for a new train station at Cambridge Science Park to facilitate further development of the site and surrounding areas as outlined in the Cambridgeshire Long Term Transport Strategy (Cambridgeshire County Council, 2014).

The East West Rail Consortium (of which Cambridgeshire County Council, Bedford Borough Council and Central Bedfordshire Council are members) proposes to reopen the Varsity Line between Oxford and Cambridge. A number of options exist for the challenging central section of the route between Bedford and Cambridge. To the east of Cambridge, services would run on the existing rail network to Norwich and Ipswich. In December 2013, the DfT confirmed its commitment to the creation of a new railway between Bedford and Cambridge.

4.3 Forecasting and scenario development

4.3.1 Forecasting methodology

To inform the identification of future traffic issues, and to estimate the impacts of potential interventions, observed flows along the route have been growthed in line with forecast growth from the National Transport Model (NTM) Road Traffic Forecasts 2015 (RTF15).

Using the forecast flows on the route a future “do nothing” scenario will be developed, allowing future problems, issues and performance to be investigated.

4.3.2 Core scenario

RTF15 contains five different growth scenarios taking account for differing growth in trip rates, oil prices and gross domestic product (GDP) and differing relationships between these factors.

To estimate the growth on the A428 corridor between Black Cat and Caxton Gibbet roundabouts scenario 1 from RTF15 has been used. This scenario assumes the number of trips people make remains constant at the historic average, incomes and costs affect travel choices in the same way as modelled in previous forecasts and uses central forecasts for future changes to income and fuel price from the Office for Budget Responsibility (OBR) and the Department of Energy and Climate Change (DECC). Growth factors that represent a rural trunk road in the east of England have been used

4.4 Future route performance

4.4.1 Travel patterns

Existing travel patterns for commuting trips were shown in Table 3.4. With significant growth in housing and employment predicted across the entire study area, it is assumed that the general patterns of travel will remain broadly similar in the future.

4.4.2 Traffic volumes

Observed flows from 2014 have been growthed to 2039 using RTF15 as outlined in section 4.3, this leads to approximately 40% growth as shown in Figure 4.1 and Table 4.2.

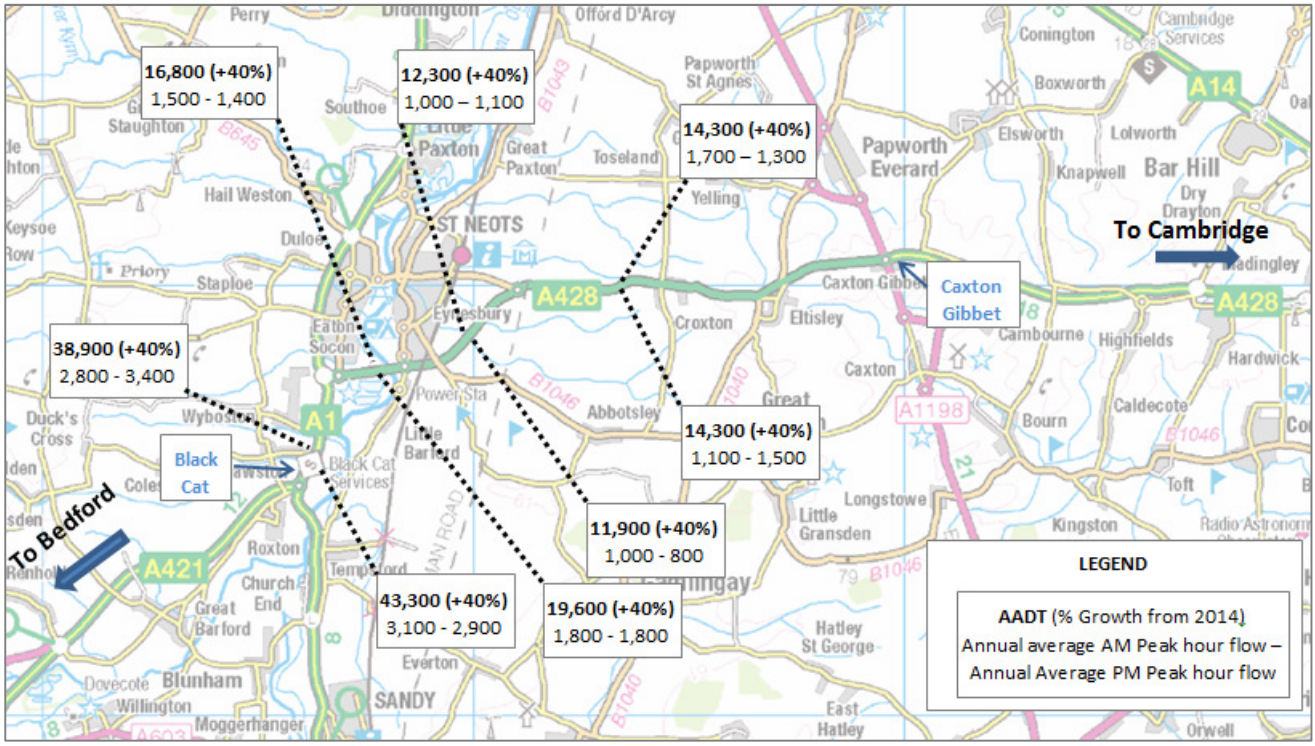


Figure 4.1 : Forecast traffic volumes in 2039

From	To	AADT (2039)	% Growth from 2014	HGV%	AM peak hour flow (8-9am)	PM Peak Hour (5-6pm)
Eastbound						
Black Cat Rbt	Wyboston Rbt	38,900	+40%	14.5%	2,800	3,400
Wyboston Rbt	Barford Rd Rbt	16,800	+40%	12%	1,500	1,400
Barford Rd Rbt	Cambridge Rd Rbt	12,300	+40%	12%	1,000	1,100
Cambridge Road Rbt	Caxton Gibbet Rbt	14,300	+40%	10%	1,700	1,300
Westbound						
Caxton Gibbet Rbt	Cambridge Road Rbt	14.300	+40%	10%	1,100	1,500
Cambridge Rd Rbt	Barford Rd Rbt	11,900	+40%	13%	1,000	800
Barford Rd Rbt	Wyboston Rbt	19,600	+40%	13%	1,800	1,800
Wyboston Junction	Black Cat Rbt	43,300	+40%	12%	3,100	2,900

Table 4.2 : Predicted traffic volumes in 2039

The proportion of HGVs on each section has been assumed to remain constant from 2014 levels.

4.4.3 Capacity and capability

The predicted forecast traffic shown in Table 4.2 have been compared with the theoretical link capacities that were calculated in Section 3.4.3 to produce predicted V/C ratios in 2039. The V/C ratios are expected to increase as a result of increased traffic flows, as shown in Table 4.3.

Section	Peak Hour Volume 2039		V/C Ratio 2039		DMRB reference capacity (veh/hr)
	AM	PM	AM	PM	
Eastbound					
A1: Black Cat roundabout to Wyboston Junction	2,800	3,400	0.76	0.92	3,700
A428: Wyboston Junction to Barford Road roundabout	1,500	1,400	1.25	1.16	1,200
A428: Barford Road roundabout to Cambridge Road roundabout	1,000	1,100	0.83	0.92	1,200
A428: Cambridge Road roundabout to Caxton Gibbet roundabout	1,700	1,300	1.42	1.08	1,200
Westbound					
A428: Caxton Gibbet roundabout to Cambridge Road roundabout	1,100	1,500	0.92	1.25	1,200
A428: Cambridge Road roundabout to Barford Road roundabout	1,000	800	0.83	0.67	1,200
A428: Barford Road roundabout to Wyboston Junction	1,800	1,800	1.50	1.50	1,200
A1: Wyboston Junction to Black Cat roundabout	3,100	2,900	0.84	0.78	3,700

Table 4.3 : Predicted V/C ratios in 2039

Table 4.3 shows that a large number of links are forecast to exceed their theoretical capacity in both the AM and PM peaks. In particular the entire route eastbound in the PM peak will either be approaching or exceeding capacity while westbound between Barford Road roundabout and Wyboston is forecast to significantly exceed capacity.

4.4.4 Journey time analysis

This study has not used a traffic assignment model and therefore future travel behaviour, travel speeds and journey times for route users have not been forecast. This analysis will be undertaken as part of further business case and scheme development. However, RTF 15 provides an estimate of average delay per vehicle in seconds per mile that have been used in indicate increases in delay.

The forecast increase in delay between 2014 and 2039 for a rural trunk road in the east of England has been estimated at 23.8%. To provide an indication of increase in delay on the route the current delays have been established by comparing AM, IP and PM TrafficMaster journey times to the OP. This current level of delay has then been growthed in line with RTF15 to provide an estimate of the forecast journey times in 2039, as shown in Table 4.4.

Route	Description	AM	IP	PM
Black Cat Roundabout to Caxton Gibbet Roundabout	Observed 2014 Journey Times	20m 34s	14m 39s	16m 58s
	Predicted Journey Time Increase by 2039	**+1m 49s**	**+25s**	**+58s**
Caxton Gibbet Roundabout to Black Cat Roundabout	Observed 2014 Journey Times	20m 16s	14m 37s	17m 13s
	Predicted Journey Time Increase by 2039	**+1m 43s**	**+23s**	**+1m 0s**

Table 4.4 : Observed and forecast journey time comparisons

As would be expected with a significant (40%) forecast increase in traffic, journey times along the route are forecast to increase.

4.4.5 Safety

In the future it is likely that the observed patterns of collisions and incidents will continue as presented in section 3.4.7 of this report. Given the forecast increase of flow within the study area, there is potential for the total numbers of collisions to increase without further intervention.

4.4.6 Public transport

Network Rail undertook a series “Market Studies” in 2013 that looked at rail performance and growth in a number of areas in consultation with industry partners and a number of stakeholders. The studies identify the strategic goals for the respective market over the 30 year 2013-2043 period, forecast the levels of demand that may need to be accommodated, and formulate conditional outputs that would be needed in order to meet those strategic goals.

The ECML which services St Neots is contained with the London and South East England Market Study (Network Rail, 2013) area. The study forecasts that total numbers of peak hour travellers on the ECML are set to increase by between 36% and 106% between 2013 and 2043.

The National Travel Survey shows that the number of trips by bus has been falling over the past 20 years; however, the decline has slowed in the last five years.

4.5 Summary

There is significant forecast growth in the vicinity of the route with local districts all expected to see an increase in population and jobs as outlined in their local plan documents, with potentially over 100,000 new homes being built by 2031.

There are also a number of key infrastructure improvements planned, such as the A14 Cambridge to Huntingdon Improvement scheme and proposals to introduce a new east-west rail link between Bedford and Cambridge providing a realistic rail alternative to the A428.

Forecast traffic growth for the region predicts an increase in total number of trips of 40% by 2039 from 2014 levels. This suggests that a number of links on the route will be operating above capacity in the future, in particular between Wyboston interchange and Barford roundabout and between Cambridge Road roundabout and Caxton Gibbet roundabout. In addition, this increase in traffic volume will lead to a growth in the level of the delay, increased journey times and poorer resilience to incidents on the route.

5. Need for intervention

5.1 Introduction

This section establishes the need for intervention in the study area. It summarises the current and future transport-related problems and their underlying causes. The identification of problems and issues builds upon the evidence presented in previous chapters, both from previous studies and from study-specific analysis.

5.2 Current and future transport related problems

The section of the A1 and A428 between Black Cat roundabout and Caxton Gibbet roundabout comprises a mixture of single and dual carriageway sections with a relatively large number of low-capacity at-grade junctions. The section of the A428 between Wyboston Junction and Caxton Gibbet roundabout is the only remaining single carriageway section.

The single carriageway section of the A428 has been identified as being unreliable, and Highways England has identified the A1 between Wyboston and Black Cat roundabout as being one of the least reliable journey time sections in the whole country.

The journey times between Black Cat roundabout and Caxton Gibbet roundabout are significantly longer in the peak time periods than in the off-peak period. This is as a consequence of road links and intermediate junctions reaching capacity and resulting in delays along the route including at the key junctions of Caxton Gibbet, Barford Road roundabout and Wyboston junction.

Significant traffic growth is predicted, with up to 100,000 new houses planned to be built in surrounding areas and over 70,000 jobs. A 40% increase in traffic flows on the A428 is forecast by 2039.

5.3 Impacts of not changing

The forecast increase in flow along the corridor will exacerbate the current problems experienced. Table 5.1 provides a summary of the future problems expected on the route.

Problem		Level of risk
1	Lack of public transport alternatives	
2	Lack of alternative routes to the A428	
3	Poor NMU provision along the route	
4	A number of junctions within a short distance of each other are operating at close to, or beyond, their maximum capacities	
5	Average speeds on the single carriageway section of the A428 are significantly lower than the dual carriageway sections on either side	
6	AM & PM peak hour traffic speeds are significantly lower than the rest of the day	
7	Unreliable journey times along the whole route between Black Cat roundabout and Caxton Gibbet roundabout	
8	Collisions and other incidents quickly lead to delays as the single carriageway offers low resilience against lane closures	
9	A lack of driver information along the A428	
10	Future economic growth potentially constrained by lack of transport provision	

	Problem Likely to be alleviated in the future (assuming currently proposed highway / land use development)
	Problem unlikely to change in the future (assuming currently proposed highway / land use development)
	Problem likely to be exacerbated in the future (assuming currently proposed highway / land use development)

Table 5.1 : Future Problems

5.4 Underlying drivers or causes

The key problems along the study corridor are insufficient capacity at certain links and junctions along the A1 and A428 resulting in unreliable journey times along certain links in the peak time periods, and low resilience to incidents due to a lack of alternative routes that run parallel to the A428.

There is low public transport patronage within the area, only 7%, compared to the national average of 11%, which is likely to be restricted due to limited public transport options within the area, particularly east west public transport services. This is also likely to have a negative impact on traffic congestion.

The key driver therefore behind these problems relates to mode choice and commuting patterns that focus journey patterns on the A428 corridor by private car, There is an excess of travel demand over the available capacity. This is exacerbated by low public transport patronage in the area which suggests that the area is heavily reliant on the private car. As such potential solutions should consider ways of reducing the demand on the route alongside ways of increasing the capacity of the route

6. Objectives and area of impact

6.1 Objectives

The RIS has eight targeted outcomes for eight designated performance areas that form the objectives for all the schemes set out in the RIS and the overall goals for the SRN within the RIS period.

Following a review of these targeted outcomes for the SRN it has been agreed that they will be used as the scheme objectives for any improvement along the A1 and A428 between Black Cat roundabout and Caxton Gibbet roundabout. The objectives are outlined below:

- Making the network safer
- Improving user satisfaction
- Supporting the smooth flow of traffic
- Encouraging economic growth
- Delivering better environmental outcomes
- Helping cyclists, walkers and other vulnerable users of the network
- Achieving real efficiency
- Keeping the network in good condition

6.2 Targets

Setting targets allows schemes to have their success monitored and informs future network development.

The RIS performance specification sets out a number of indicators and requirements for any scheme. This sets out the key performance indictors (KPIs), performance indictors (PIs), requirements and national targets for each RIS objective.

Using these national targets as the targets for improvements to A428 would not be suitable as the targets proposed may not applicable for the corridor, however, performance against the KPIs should provide suitable, measurable targets for each of the RIS objectives. The KPIs, national targets and proposed targets for potential improvements for each of the RIS objectives are presented in Table 6.1.

RIS Objective	KPI(s)	National Target	A428 Black Cat to Caxton Gibbet target
Making the network safer	The number of KSIs on the SRN.	A decrease of at least 40% by the end of 2020 against 2005-09 baseline.	Reduce the number of KSIs along the corridor
User satisfaction	The percentage of National Road Users' Satisfaction Survey (NRUSS) respondents who are very or fairly satisfied.	Achieve a score of 90% by 31 March 2017 and then maintain or improve it.	N/A
Supporting the smooth flow of traffic	Network availability: the percentage of the SRN available to traffic	Maximise lane availability so that it does not fall below 97% within one rolling year.	Improve journey times and journey time reliability on the corridor.
	Incident management: percentage of motorway incidents cleared within one hour	At least 85% of all motorway incidents cleared within one hour	
Encouraging economic growth	Average delay (time lost per vehicle mile)	N/A	Improve journey times along the corridor improving the connectivity between economic centres.
Delivering better environmental outcomes	Noise: Number of noise important areas mitigated	Mitigate at least 1,150 noise important areas by the end of the first roads investment period.	Reduce noise impacts at sensitive receptors. There is a noise important area to the north of Black Cat junction.
	Biodiversity: Delivery of improved biodiversity, as set out in the company's biodiversity action plan.	Reduce net biodiversity loss on an ongoing annual basis.	Mitigate or compensate for any loss of biodiversity habitat.
Helping cyclists, walker and other vulnerable users of the network	The number of new and upgraded crossings.	N/A	Improve conditions for NMUs along the corridor
Achieving real efficiency	Cost savings: Savings on capital expenditure.	Total savings of at least £1.212 billion over Road Period[24] (RP1) on capital expenditure.	N/A
	Delivery plan progress: progress of work, relative to forecasts set out in the delivery plan, and annual updates to that plan, and expectations at the start of RP1.	Meet or exceed forecasts set out in the delivery plan.	N/A
Keeping the network in good condition	The percentage of pavement asset that does not require further investigation for possible maintenance.	Percentage of pavement not in need of maintenance to be 95% or above.	N/A

Table 6.1 : A428 scheme targets

[24] 2015/16-2019/20 Road Period 1 (RP1)
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/408514/ris-for-2015-16-road-period-web-version.pdf

6.3 Geographic area of impact

Identifying the geographic area of impact for any intervention is an important part of the option identification process as it sets bounds on what corridor or study area the objectives will apply to.

The objectives derived in this chapter were identified based on the problems and issues outlined in Section 5. These objectives are relevant to the A1 and A428 between Black Cat roundabout and Caxton Gibbet roundabout. The broad geographic area of impact to be addressed is shown in Figure 6.1. The definition of the area of impact will be refined further alongside the development of the ASR.

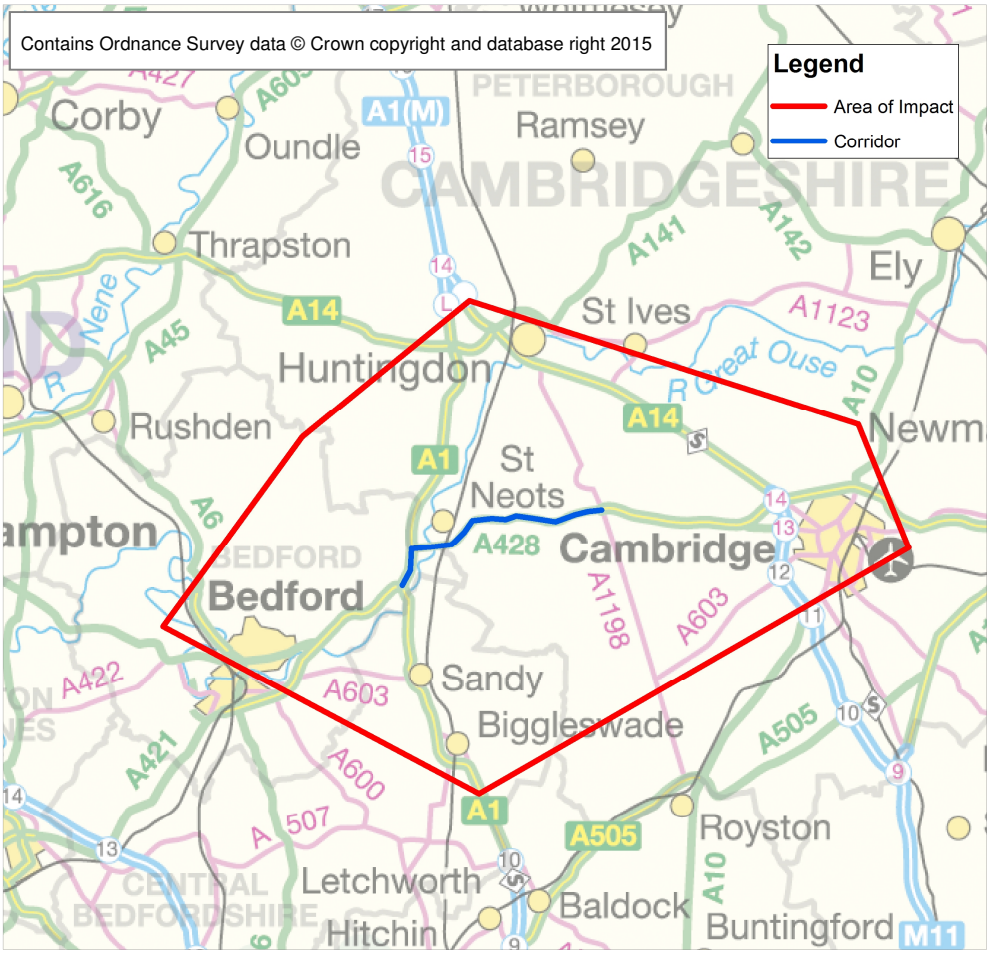


Figure 6.1 : A428 Black Cat to Caxton Gibbet Area of Impact

7. Option generation

7.1 Introduction

The purpose of the option generation process is to develop a wide range of measures or interventions that are likely to go some way to alleviating the problems and issues identified in chapter 5 and that are likely to achieve the objectives identified in chapter 6.

Options have been considered across all travel modes, infrastructure, regulation and other ways of influence travel behaviour or that influence the need to travel.

This options generation process adopted for this project is detailed in Figure 7.1.

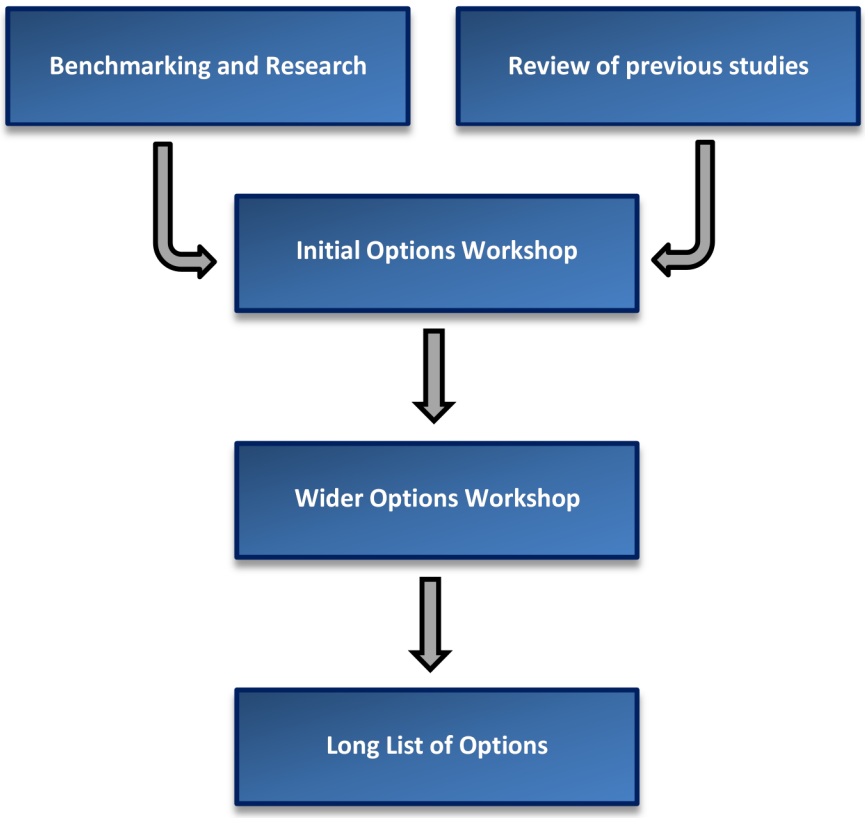


Figure 7.1 : Option generation process

7.2 Benchmarking and research

To help inform the option development process, planned and recently implemented junction schemes from around the UK and abroad have been examined to ensure current best practice is considered as part of the process. Additionally, innovative designs which have not yet been implemented in the UK have been examined.

The improvement schemes examined include:

- A1 North of Newcastle
- A421 Bedford to M1 Junction 13

7.3 Option generation

7.3.1 Introduction

The purpose of the option generation process is to develop a range of measures or interventions which have the potential to achieve the objectives outlined in Chapter 6. An initial long list of potential improvement options have been developed through a series of workshops informed by the following:

- Relevant policy and strategy documents
- Previous studies
- Analysis of available data
- Previous stakeholder engagement held during the RBS process

7.3.2 Options proposed in previous studies

The first stage of the option generation process was to review the previous studies into improvements on the A1 and A428 between Black Cat roundabout and Caxton Gibbet roundabout as described in section 2.

All options proposed as part of previous studies have been considered as part of this process and where appropriate taken forward into the long list of initial options.

7.3.3 Initial option generation workshop

The next stage of the option generation process was to hold an initial workshop to identify and discuss potential interventions. The workshop on 10/07/2015 included a review of the identified problems at the junction and a detailed discussion about the scheme objectives. In line with best practice, this ensured that potential objectives were driven by the needs of the transport users within the corridor. A high level list of potential improvements was developed considering all modes of transport.

Building upon the workshop outcomes, additional option variants were developed by the project team and added to the long list of options.

7.3.4 Wider option generation workshop

Following this, a second workshop attended by the wider Jacobs project teams was held on 04/08/15. This workshop included transport planning, highways, technology and safety specialists alongside Highways England representatives to provide a wide breadth of understanding and expertise.

The workshop covered a review of the proposed scheme objectives and how they linked to both policy and the identified problems and issues, including a review of the problems and issues evidence base. The attendees then split into groups to independently brainstorm potential solutions to feed back into the initial long list of options.

This approach allowed the independent generation of potential solutions from a range of perspectives, ensuring the options list was not constrained to a single travel mode or pre-conceived historical solutions.

7.3.5 Long List of Options

Following the two workshops and further development from the project team a long list of options has been developed, this categorises the improvements under the following headings:

- Lane widening.
- Junction improvements.
- Offline alignment.
- Public transport improvements.

In total 50 potential improvements have been considered and are presented in Appendix E.

8. Option sifting

8.1 Introduction

To quickly and effectively assess the large number of initial options generated, a two stage sifting process has been adopted; first an initial sift was carried out utilising a bespoke sifting tool, with the results feeding into a second stage using DfT's Early Assessment and Sifting Tool[25] (EAST).

All options identified in the option generation stages have been considered in terms of meeting the key objectives identified for intervention; fit with existing local, regional and national programmes and strategies; and key viability and acceptability criteria to establish the appropriateness of each option for full assessment.

Options that would fail to address the scheme objectives or are unlikely to pass key viability and acceptability criteria were discarded.

8.2 Stage one: initial sift

8.2.1 Methodology

The initial sifting tool is intended to quickly evaluate a large number of options and discard those which are clearly unsuitable ahead of further assessment. This framework provides an efficient, robust and easily presentable means of identifying legitimate options to be considered further. It has been developed with consideration of the DfT's EAST, and supports the 'scale of impact' and 'fit with other objectives' criteria within the tool. The tool assesses options based on their ability to meet to the following criteria:

- Identified problems
- Study objectives
- Scheme deliverability
- Scheme feasibility

Options are scored on a five point scale against each problem and adjective, which is then been combined to produce an overall score. The scoring process is based on qualitative evidence as far as possible as well as professional judgement where required. The simple numerical approach allows consistency in evaluation across options.

Against deliverability and feasibility, each option is deemed to be either 'likely', 'likely (with challenges)' or 'unlikely'. The adopted definitions of deliverability and feasibility in this context are provided in Table 8.1.

Supporting analysis	Description
Deliverability	Consideration of issues around deliverability e.g. in terms of political, planning, timescale or third party issues.
Feasibility	Consideration of practicalities which may present issues in delivery (e.g. physical constraint, land availability and design standards)

Table 8.1 : Criteria definition

Initial sifting criteria looks to identify and carry forward into EAST options which:

- have an overall moderate impact or greater against identified problems
- have an overall moderate fit or greater with route objectives

[25] DfT, 2013. Early Assessment and Sifting Tool (EAST). https://www.gov.uk/government/publications/transport-business-case

- are likely to be deliverable
- are likely to be feasible

Further details of the initial sift tool and the scoring methodology are provided in Appendix G.

8.2.2 Results

A copy of the initial sift tool is provided in Appendix H. This initial assessment suggested that there 16 options suitable to take forward for further assessment in EAST, as presented in Table 8.2.

Option ref.	Option description
A1	A428 full widening.
B1	A428 offline dualling between Black Cat roundabout and Caxton Gibbet roundabout.
C1	A428 full offline dualling with grade separation of Black Cat roundabout and grade separation of Caxton Gibbet roundabout.
C2	A428 full offline dualling with grade separation of Black Cat roundabout and signalisation of Caxton Gibbet roundabout.
C3	A428 bypass to Cambridge Road roundabout with grade separation at Caxton Gibbet, grade separation at Black Cat and local widening with channelisation between Cambridge Road roundabout and Caxton Gibbet roundabout.
C4	A428 bypass to Cambridge Road roundabout with signalisation at Caxton Gibbet roundabout, grade separation at Black Cat roundabout, local widening with channelisation between Cambridge Road roundabout and Caxton Gibbet roundabout.
C5	A428 bypass to Cambridge Road roundabout with grade separation at Black Cat, and grade separation at Caxton Gibbet roundabout.
C6	A428 bypass to Cambridge Road R'bout with grade separation at Black Cat roundabout, and signalisation at Caxton Gibbet roundabout.
C7	A428 single lane carriageway bypass to Cambridge Road roundabout with online dualling between Cambridge Road roundabout and Caxton Gibbet roundabout, grade separation at Black Cat roundabout and grade separation at Caxton Gibbet roundabout.
C8	A428 full online dualling with grade separation at Black Cat roundabout and Grade separation at Caxton Gibbet roundabout.
C9	A428 full online dualling with grade separation at Black Cat roundabout and signalisation at Caxton Gibbet roundabout.
C10	Local junction widening with channelisation at existing A428 junctions, grade separation at Caxton Gibbet roundabout, grade separation at Black Cat roundabout and upgrade to existing A1 junctions.

Option ref.	Option description
C11	Local junction widening with channelisation at existing A428 junctions, signalisation at Caxton Gibbet roundabout, grade separation at Black Cat roundabout and upgrade to existing A1 junctions.
C13	Online dualling of the A428 between St Ives Road and Caxton Gibbet roundabout and signalisation of Caxton Gibbet roundabout.
C14	Grade separation of Black Cat roundabout and signalisation of Caxton Gibbet roundabout.
C16	A428 dual carriageway bypass to Cambridge Road roundabout with online dualling between Cambridge Road roundabout and Caxton Gibbet roundabout, grade separation at Black Cat roundabout and grade separation at Caxton Gibbet roundabout

Table 8.2 Potential intervention options

8.3 Stage two: early assessment and sifting process

The DfT's EAST has been used to further sift potential options identified by the initial sift tool. EAST is consistent with WebTAG transport business case principles and has been developed to summarise and present evidence on options in a clear and consistent format. It utilises a simple 5-point Red/Amber/Green (RAG) scoring system for each assessment area.

Details of the assessment of each potential option are included in Appendix I and a summary of the resulting EAST scores is given in Table 8.3 (where higher scores represent more positive impacts). The summary table is intended to provide a visual guide of the performance of each option; overall impact will depend on the strength of individual impacts and identified risks. Environmental considerations at this stage have been informed through a supporting environmental assessment report.

	Strategic			Economic						Managerial			Financial			Commercial
Option	Scale of Impact [illegible]	transport and government objectives	Fit with other objectives	Economic Growth	Carbon Emissions	Socio-distributional and the regions	Local Environment	Wellbeing	Expected VFM	Implementation time table	Public Acceptability	Practical Feasibility	Affordability	Capital Cost	Overall Risk	Flexibility of Option
Option A1	3	4	3	4	3	4	3	3	Medium	5-10 years	3	3	3	£500-1000	3	3
Option B1	4	4	3	4	3	4	2	4	Medium	5-10 years	4	5	2	£500-1000	5	2
Option C1	4	4	3	5	3	4	2	4	High	5-10 years	4	5	2	£500-1000	5	3
Option C2	4	4	3	4	3	4	2	4	High	5-10 years	4	5	2	£500-1000	5	3
Option C3	4	4	3	4	3	4	3	4	High	5-10 years	2	4	3	£500-1000	5	4
Option C4	4	4	3	3	3	4	3	4	High	5-10 years	2	4	3	£500-1000	5	4
Option C5	4	4	3	4	3	4	3	4	High	5-10 years	2	5	4	£250-500	5	3
Option C6	3	4	3	3	3	4	3	4	High	5-10 years	2	5	4	£250-500	5	3
Option C7	4	4	3	4	3	4	3	4	High	5-10 years	3	5	4	£250-500	3	4
Option C8	4	4	3	4	3	4	3	4	Medium	5-10 years	3	3	3	£500-1000	3	4
Option C9	4	4	3	3	3	4	3	4	Medium	5-10 years	3	3	3	£500-1000	3	3
Option C10	3	3	3	4	3	4	3	4	Medium	5-10 years	1	3	5	£100-250	3	5
Option C11	3	3	3	3	3	4	3	4	Medium	5-10 years	1	5	5	£100-250	3	5
Option C13	3	3	3	2	3	3	3	3	Medium	5-10 years	1	5	5	£50-100	3	3
Option C14	3	3	3	3	3	3	3	4	Medium	5-10 years	1	5	5	£50-100	3	3
Option C16	4	4	3	5	3	4	2	4	High	5-10 years	3	5	2	£500-1000	3	4

Table 8.3 : EAST summary

Following a review of EAST it was identified that all of the options fell within a £1 billion budget, however, some of the schemes were less expensive than others. The more expensive scheme were generally expected to provide a larger scale of impacts.

8.4 Shortlisted options

The following shortlist shown in Table 8.4 was considered to comprise distinct and feasible (or potential) options for further development and assessment.

Option ref.	Option description
C1	A428 full offline dualling with grade separation of Black Cat roundabout and grade separation of Caxton Gibbet roundabout.
C2	A428 full offline dualling with grade separation of Black Cat roundabout and signalisation of Caxton Gibbet roundabout.
C5	A428 bypass to Cambridge Road roundabout with grade separation at Black Cat, and grade separation at Caxton Gibbet roundabout.
C6	A428 bypass to Cambridge Road R'bout with grade separation at Black Cat roundabout, and signalisation at Caxton Gibbet roundabout.
C7	A428 single lane carriageway bypass to Cambridge Road roundabout with online dualling between Cambridge Road roundabout and Caxton Gibbet roundabout, grade separation at Black Cat roundabout and grade separation at Caxton Gibbet roundabout.
C10	Local junction widening with channelisation at existing A428 junctions, grade separation at Caxton Gibbet roundabout, grade separation at Black Cat roundabout and upgrade to existing A1 junctions.
C11	Local junction widening with channelisation at existing A428 junctions, signalisation at Caxton Gibbet roundabout, grade separation at Black Cat roundabout and upgrade to existing A1 junctions.
C16	A428 dual carriageway bypass to Cambridge Road roundabout with online dualling between Cambridge Road roundabout and Caxton Gibbet roundabout, grade separation at Black Cat roundabout and grade separation at Caxton Gibbet roundabout

Table 8.4 Shortlisted options for assessment

9. Option assessment

9.1 Introduction

This section presents the assessment of potential intervention options described in section 8.4. It outlines the option assessment methodology developed in order to distinguish the relative costs, benefits and impacts of the options under consideration.

Options have been assessed against the '5 cases model' criteria: strategic, value for money (economic), delivery (management), financial and commercial. Results have allowed the identification of the better performing options, and informed recommendations of the preferred option to be taken forward. Further information is presented in Appendix J.

9.2 Assessment methodology

9.2.1 General approach

At this early stage of scheme development, an intentionally proportionate approach has been taken to the assessment of options. Aside from construction costings and measurement of economic benefits associated with travel time reduction, a high level qualitative approach has been generally adopted for assessment against the 5 case model. The approach to economic assessment and scheme costings is described in the following sections.

9.2.2 Economic assessment

The quantitative economic analysis considers the economic impact of change in road user travel time and vehicle operating cost benefits. Although improvement to the A428 would likely result in additional economic impacts such as those associated with altered traffic collision rates and travel reliability, these have been omitted from the analysis and will be consider in more detail at a later stage in the PCF process.

A spreadsheet-based tool was developed in line with WebTAG guidance and seeks to make best use of readily available traffic data. The premise of the assessment is that the introduction of a scheme and associated upgrading of any existing carriageway standards will result in changes in the speed and/or distance that vehicles travel. The benefits of these changes can be monetised using standard economic parameters of traveller's value of time (VOT) and vehicle operating costs (VOC) as provided in the WebTAG data book (November 2014).

An important feature of the spreadsheet assessment is the user definition of a carriageway type with and without the introduction of a scheme. Based upon the carriageway type, a WebTAG defined speed flow curve is assigned in the spreadsheet, which for a given level of traffic flow outputs an average travel speed. The approach only considers changes in average speed that are caused by link capacity issues. The link speeds that are derived from the spreadsheet are reviewed against the available observed data. When the results are not found to be intuitive when compared to known conditions, alternative assumptions for forecast link speeds are considered, based on the observed data.

It is through a comparison of the with and without scheme travel speeds (and distances) in the opening and design years, that the travel time and vehicle operating cost benefits of the scheme can be interpolated over a 60 year appraisal period and monetised. The tool has been previously reviewed and approved for use by TAME on Highways England projects. Fully WebTAG compliant modelling will be required to inform the development of a full business case at a later date.

The following input data has been used to undertake traffic analysis of the A428 scheme:

- Highways England Traffic Flow Data System (TRADS) two-way traffic volume data, recorded between January 2014 and December 2014.

- Trafficmaster travel speed data, recorded between September 2013 and August 2014, supplied by the Department for Transport.
- Trafficmaster origin-destination (OD) data recorded between September 2013 and August 2014, supplied by the Department for Transport.

To determine the likely split of traffic between the A428 bypass and the de-trunked A428 carriageway, current travel patterns have been analysed using Trafficmaster OD data.

As a consequence to the limited availability of traffic volume data at this stage of assessment, detailed junction modelling using standard packages such as LinSig or TRL Junctions has not been undertaken. Instead, to quantify the junction related impact to road user travel time resulting from the proposed scheme, the approach based on the premise of reduced control delay was adopted. This approach was applied to junction through movements which would be improved to free flow under the proposed scheme. It is expected that other junction movements would likely see a reduction in delay resulting from the scheme improvements.

This approach has been applied at the following locations:

- Caxton Gibbet roundabout; east and west through movements
- Black Cat roundabout; east and west and north and south through movements

The reduction in control delay for through movements improved to free flow is determined as follows:

- The spatial extent of control delay for each analysis period (AM, IP, PM) is determined visually using Trafficmaster average speed data
- The free flow speed on approach to the junction is determined using Trafficmaster average speed data at a point outside the influence of the junction
- Total travel time for the movement through the spatial extent of control delay is calculated using Trafficmaster data
- Reduction in delay (or travel time saving) is then calculated as the difference between the observed travel time and estimated free flow travel time over the delay extent
- This approach does not take into account lane flow capacity constraints which may result in reduced travel speeds under increased future demand, potentially leading to overestimation of travel time savings
- However, given the approach excludes time savings for turning movements and assumes fixed Do Minimum travel conditions, it is considered to be overall conservative

Due to the lack of available junction models, it was assumed that the signalisation of Caxton Gibbet roundabout provided half the benefits than if the roundabout was to be grade separated.

The construction of the A428 scheme is assumed to begin in 2022, with the scheme opening to traffic in 2024 and the design year being 2039. AM peak hour, inter-peak (IP) and PM peak hour traffic analysis has been undertaken for the both the opening and design years. Forecast traffic demands for the 2024 opening year and 2039 design year have been derived by applying Road Traffic Forecast (RFT15) Scenario 1 growth for a rural trunk road in the east of England to current year flows.

9.2.3 Scheme costs

For the purposes of the economic assessment, it has been necessary to develop indicative outline scheme costs for the proposed options. The information is the ‘most likely’ indicative outturn cost taken from ‘Commercial Services Division (CSD) Technical Note – A428 & A12-A120 Optioneering Report 15102015’. It should be noted that these estimates should be treated as highly indicative and have only be used for the purposes of exploring potential viable options in this report. Table 9.1 provides a summary of the scheme cost used in the economic assessment.

Options C1 and C7 were estimated and identified within the CSD technical note. For all remaining shortlisted options, a broad likely cost range has been assigned based on professional judgement and the known cost of

similar schemes. These costs have been estimated Jacobs, rather than Highways England commercial services and carry a high level of uncertainty. Table 9.1 provides a summary of all scheme cost used in the scheme assessment. Costs are presented as year 2014 estimates.

Option	Cost
C1	£1bn
C2	£500m-£1bn
C5	£250m-£500m
C6	£250m-£500m
C7	£500m
C10	£100m-250m
C11	£100m-250m
C16	£500-1000m

Table 9.1 : Scheme costs

In order to develop present value costs (PVC) for use in the economic assessment of the options, the following assumptions have been made:

- A three year construction period has been assumed, with costs split evenly over the period 2022 – 2024
- Land and preparation costs are likely to be incurred prior to 2021 but the spend profile of these costs has not been considered as part of this work
- Scheme costs have been discounted to 2010 prices using a discount rate of 3.5% and converted to 2010 prices using GDP deflator

9.2.4 Limitations

Based on the adopted methodology, a number of caveats and limitations of the analysis presented in this technical report should be noted:

- Lack of an appropriate transport model for the assessment and calculation of scheme benefits
- A fixed traffic demand has been used across the DS and DM scenarios. As such, the effect of route choice behaviour is not captured
- Limited modelling of route choice
- Limited junction modelling. This is highlighted by the lack of sensitivity in estimated benefits to the differences between options which are primarily junction related. Additionally, the travel time benefits of removing at-grade junctions have likely been substantially under estimated
- National average trip purpose splits have been adopted, rather than locally adjusted ones
- Assumptions relating to availability of data, such as the use of the most recent available data and/or the use of data from adjacent sites for other road links where unavailable
- Exclusion of other benefits typically presented

9.3 Appraisal results

9.3.1 Case 1: strategic fit

As detailed in section 5, there is a clear need for intervention on the A428 between Black Cat roundabout and Caxton Gibbet roundabout. The likely outcome of no intervention is substantially worsened congestion on the A428, sections of the A1, and local routes including increases in travel time and constriction of development in and around St.Neots.

All the shortlisted options are expected to significantly improve traffic conditions on the A428 and A1, in particular all are likely to add capacity to congested sections of the A428 and alleviate queuing at the two major junctions Black Cat roundabout and Caxton Gibbet Roundabout. As such these are likely to aid the development goals of the region.

All options are likely to support national, regional and local policy, with Option C1 having the strongest fit with policy by having the largest impact on journey times, economic growth and congestion.

9.3.2 Case 2: value for money

Appraisal summary tables (AST)

The AST provides decision makers with a concise overview of a scheme across the full range of potential monetised, qualitative and quantitative impacts. This includes economic, environmental, social, and impacts on public accounts.

At this stage potential benefits and disbenefits to be accrued from sub-objectives such as noise, local air quality, landscape, biodiversity, water environment, accident savings, physical activity and journey quality have not been quantified. Due to the current stage of scheme development and level of information currently available, these have instead been assessed qualitatively. Full monetised assessments will be completed as the business case develops based on the availability of more detailed information at successive stages of scheme development. Appendix K contains the AST for each option.

Monetised impacts

A summary of the economic analysis of each option is provided in Table 9.2.

It has not been possible to calculate monetised benefits for the local junction widening with channelisation at existing A428 junctions, and the upgrade to existing A1 junctions as a consequence of the limited traffic data with regard to operation. It can be assumed that these measures would provide further benefits to Options C10 and C11 that are shown in Table 9.2.

Option	PVB	PVC	NPV	Estimated BCR
C1	£750m	£707m	£43m	1.1
C2	£694m	£354m-£707m	-£13m -£340m	1-2
C5	£481m	£177m-£354m	£127m -£304m	1.4-2.7
C6	£426m	£177m-£354m	£249m-£72m	1.2-2.4
C7	£606m	£354m	£252m	1.7
C10	£182m	£71-£177m	£5m- £111m	1-2.6
C11	£127m	£71-£177m	-£50m-£56m	0.7-1.8
C16	£637m	£354m-£707m	-£70m-£283m	0.9-1.8

Table 9.2 : Shortlisted options costs and benefits

From the economic results, it can be seen that the value of benefits generally scales with the size and cost of the scheme, with C1 providing the greatest benefit while C10 and C11 providing the least. However it should be noted that this pattern does not follows in the same way for the BCR values. The BCR's indicate a range of possible monetised impacts with schemes predominantly indicating low to medium value for money.

Social impacts

Given the similar nature of all the options being considered the options are all assessed as having similar social impacts, with neutral impacts on physical activity, accidents, security, access to services, affordability,

severance and option and non-use values and all the options having a varying degree of beneficial impact on journey quality.

Environment

Each of the options has been qualitatively assessed against the WebTAG environmental impacts. All the shortlisted options are considered to have a mix of beneficial and adverse environmental impacts. Options C1, C2, C7 and C16 are likely to have a moderate beneficial impact on noise while options C10 and C11 are likely to have a moderate adverse impact. Options C1, C2, C5, C6, C7 and C16 are expect to have a slight beneficial impact on air quality with their off line components likely to move traffic away from sensitive receptors and residential areas, Options C10 and C11 do not receive this benefit. All options are likely to have adverse impact on landscape, historic environment and water environment; however, options C10 and C11 are likely to have a lesser impact.

9.3.3 Case 3: financial case

A budget of £1 billion has been assumed for the purposes of this option assessment process although matters associated with budgets and affordability are under continual review.

All potential options fall within the £1 billion budget, however, the schemes estimated costs range from between £100 million to £1 billion.

Maintenance costs for the scheme are assumed to place a medium to long term ongoing maintenance liability on Highways England following the adoption of new roads e.g. resurfacing / renewal of the additional highway infrastructure, a net increase in additional drainage clearance, lighting operation, structural inspections etc. It could also be considered, however, that some schemes will reduce traffic volumes on existing roads which could have a positive impact upon the condition of those roads. At this stage, however, the cost implications of this are unknown, and have not been incorporated into a whole life value for money assessment.

9.3.4 Case 4: delivery case

Highways England's PCF process provides a robust assurance and risk management framework with a proven record through the successful delivery of a wide range of major highways schemes.

Given the scale of some of the options (C1, C2, C7 and C16) and the level of engineering required, Highways England may need to appoint multiple designers and contractors leading to more complex governance arrangements than would be required for lower cost scheme. Options C10 and C11 may be able to be delivered with a single designer and contractor leading to more simple governance and risk management arrangements.

It is likely that large scale options will have similar delivery timescales with works estimated to begin 2022 and the route opening to traffic 2024. However, it is recognised that smaller scale improvements such as C10 and C11 could be delivered in a reduced timescale.

No stakeholder engagement has taken place as part of this analysis; however, stakeholder engagement was carried out as part of the RBS process. Stakeholders in any scheme at the junction are likely to include Cambridgeshire County Council, Huntingdonshire District Council, GCGP LEP and statutory bodies such as Natural England.

No public consultation has taken place as part of this analysis but it is believed that all the shortlisted schemes are likely to receive some level of support from the public. However, it is acknowledged that smaller scale improvements such as options C10 and C11 may be considered insufficient by some members of the public.

9.3.5 Case 5: commercial case

The PCF is a joint DfT and Highways England approach to managing major projects. It comprises a standard project lifecycle, standard project deliverables, governance arrangements and project control processes, which all major projects must adhere to as part of the development and delivery of a scheme.

Currently the scheme is progressing through stage 1 of the options phase. Key outputs / deliverables to be produced during this phase include:

- An appraisal specification report (ASR) and AST.
- Refined cost estimates.
- A risk management plan, risk register and qualitative risk assessment.
- A public consultation strategy.

These outputs will provide the basis for monitoring and evaluating the success of the scheme in delivering the key objectives set out in Highways England's RIS, and will be updated as necessary as the business case develops.

Highways England's new procurement framework for the delivery of major highway schemes known as the collaborative delivery framework (CDF) provides a clear and robust procurement route for major projects. Therefore it is likely that any the shortlisted schemes would be brought to market via the CDF.

The principles of the CDF are to achieve continuous improvement in health and safety, sustainability, quality, time and cost.

Throughout the development of any option risks will be recorded and actively managed. Where appropriate, risk owners will be allocated and tasked with eliminating risks, where possible, or identifying mitigation measures for residual risks. The same ethos will be taken through to the delivery stages of the scheme.

External risk allocation and transfer will be defined as per Highway England's CDF. The Highways England project manager would be primarily responsible for risk management and the dissemination of information at regular intervals to the SRO and project board.

Any contract will be managed through Highways England's contract terms and conditions and suppliers will be measured and evaluated against the measuring success toolkit (MST) on a bi-monthly basis.

9.4 Preferred option

On review of the available evidence and assessment to date it is considered that Option C1 is the best performing option for the following reasons:

- It is considered to have the largest impact on the problems and issues affecting the operation of the route
- It is considered to have the best fit with government policy
- It is estimated to have the highest level of economic benefits
- It is considered to have a higher level of public acceptability than other options
- There is a robust assurance and risk management framework available
- There is a clear and defined procurement framework available

However, it is acknowledged that Option C1 is estimated to deliver low VfM whereas some options can deliver medium or high VfM.

Options C1 and C2 are considered to be variants of one another with the only difference being the level of intervention at Caxton Gibbet (grade separation compared to signalisation). At this stage it has not been determined whether a full grade separation of the junction will be required given future traffic flows and further assessment will need to be carried out in PCF stage 1 to better understand which variant is taken forward.

The "next best" performing option is difficult to identify with options C5, C6, C7 and C16 all performing similarly. Options C7 and C16 are considered variants of one option, with the only difference being a single carriageway or dual carriageway bypass between Black Cat roundabout and Cambridge Road roundabout; similarly options C5 and C6 are effectively the same aside from the level of intervention at Caxton Gibbet.

Options C7 and C16 provide a higher level of benefit than options C5 and C6 although they are more expensive; however, options C7 and C16 are expected to have a more significant beneficial impact on noise

(moderate beneficial compared to slight beneficial) and improved noise conditions are one of the major KPIs designated for the RIS, therefore it is considered the “next best”.

Options C10 and C11 are another pair of options that are only differentiated by the level of intervention at Caxton Gibbet roundabout and are the lowest cost options considered to perform well against the problems and issues on the route. Therefore options C10 and C11 are considered the “low cost” solution.

In summary the options proposed to be progressed through the SOBC are:

- **Preferred solution** – Option C1/C2 – Full offline dualling between Black Cat roundabout and Caxton Gibbet roundabout with grade separation Black Cat roundabout and either grade separation or signalisation at Caxton Gibbet.
- **Next best solution** – Option C7/C16 – An offline bypass between Black Cat Roundabout and Cambridge Road Roundabout, either dual or single carriageway standard, online widening between Cambridge Road Roundabout and Caxton Gibbet roundabout with both Black Cat roundabout and Cambridge Road roundabout being grade separated.
- **Low cost solution** – Option C10/C11 – Local junction widening along the A428, improvements to A1 junctions and Black Cat roundabout grade separated with either Grade Separation or signalisation at Caxton Gibbet roundabout.

10. Summary and next steps

10.1 Summary

Following collection of available data and subsequent analysis it has been identified that the A428 Black Cat to Caxton Gibbet route suffers from a series of problems, as outlined below:

- There are inadequate public transport options along the corridor; which has only limited bus services and no parallel rail service provision.
- There is a lack of viable alternative east-west routes between Cambridge and other economic centres such as Milton Keynes, Northampton and Bedford.
- There is poor non-motorised user provision along the corridor.
- A number of junctions along the corridor operate close to, or at capacity.
- Peak hour speeds along the corridor are significantly lower than the rest of the day.
- Speeds on the single carriageway sections of the corridor are significantly lower than those that are dualled.
- There is a high degree of journey time variability along the corridor, making it difficult for users to plan their journey with confidence.
- There is low resilience against accidents and incidents on the single carriageway sections of the corridor.
- There is a lack of driver information along the corridor.
- The above problems also constrain economic growth along the corridor.

The National Traffic Model's RTF15 forecasts predict a significant increase in traffic in the area by 2039 which is likely to exacerbate many of these problems.

As such there is a clear need for intervention at the junction. Improvements to the A1 and A428 were announced in the first RIS, as such the RIS' targeted outcomes for the SRN have been used as the objectives for any scheme taken forward, these are:

- Making the network safer
- Improving user satisfaction
- Supporting the smooth flow of traffic
- Encouraging Economic Growth
- Delivering better environmental outcomes
- Helping cyclists, walkers and other vulnerable users of the network
- Achieving real efficiency
- Keeping the network in good condition

A wide range of options have been generated based on the identified problems and issues at the junction, this included consideration of innovative options that have not been implemented in the UK before alongside established solutions that have been shown to be successful elsewhere on the SRN. These options were then assessed using an initial sifting tool that assessed likely performance against the identified problems, route objectives, deliverability and feasibility.

Fifteen better performing options were identified for further assessment using the DfT's EAST which resulted in seven options being taken forward for further assessment against the Treasury Five Case Model in line with the DfT's Option Assessment Framework.

All the options provide significant benefits, with the more expensive options generally providing the larger benefits. Option C1 is the best performing as it is considered to have the largest impact on the identified problems along the study corridor, and one of the strongest fits with government policy. The estimated economic impacts including PVB and PVC are provided in Table 10.1.

Option	Estimated User Benefits	Estimated PVC (2010 costs, discounted to 2010)	BCR
C1 - A428 full offline dualling with grade separation of Black Cat roundabout and grade separation of Caxton Gibbet roundabout	£750m	£707m	1.06
C2 - A428 full offline dualling with grade separation of Black Cat roundabout and signalisation of Caxton Gibbet roundabout	£694m	£354m-£707m	1.0-2.0
C5 - A428 bypass to Cambridge Road roundabout with grade separation at Black Cat, and grade separation at Caxton Gibbet roundabout	£481m	£177m-£354m	1.4-2.7
C6 - A428 bypass to Cambridge Road roundabout with grade separation at Black Cat roundabout, and signalisation at Caxton Gibbet roundabout	£426m	£177m-£354m	1.2-2.4
C7 - A428 single lane carriageway bypass to Cambridge Road roundabout with online dualling between Cambridge Road roundabout and Caxton Gibbet roundabout, grade separation at Black Cat roundabout and grade separation at Caxton Gibbet roundabout	£606m	£354m	1.7
C10 - Local junction widening with channelisation at existing A428 junctions, grade separation at Caxton Gibbet roundabout, grade separation at Black Cat roundabout and upgrade to existing A1 junctions	£182m	£71-£177m	1.0-2.6
C11 - Local junction widening with channelisation at existing A428 junctions, signalisation at Caxton Gibbet roundabout, grade separation at Black Cat roundabout and upgrade to existing A1 junctions	£127m	£71-£177m	0.7-1.8
C16 - A428 dual carriageway bypass to Cambridge Road roundabout with online dualling between Cambridge Road roundabout and Caxton Gibbet roundabout, grade separation at Black Cat roundabout and grade separation at Caxton Gibbet roundabout	£637m	£354m-£707m	0.9-1.8

Table 10.1 : Shortlisted options costs and benefits

The identified schemes to be taken forward are:

- Preferred solution – Option C1/C2 – Full offline dualling between Black Cat roundabout and Caxton Gibbet roundabout with grade separation Black Cat roundabout and either grade separation or signalisation at Caxton Gibbet
- Next best solution – Option C7/C16 – An offline bypass between Black Cat roundabout and Cambridge Road roundabout, either dual or single carriageway standard, online widening between Cambridge Road

roundabout and Caxton Gibbet roundabout with both Black Cat roundabout and Cambridge Road roundabout being grade separated

- Low cost solution – Option C10/C11 – Local junction widening along the A428, improvements to A1 junctions and Black Cat roundabout grade separated with either grade separation or signalisation at Caxton Gibbet roundabout

10.2 Next steps

The next step in the process will be the development of an SOBC to further build the case for the progression of improvements of the A1 and A428 between Black Cat roundabout and Caxton Gibbet roundabout through to PCF Stage 1.

The SOBC will further develop the assessment against the Treasury 5 case model.

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Appendix A. Glossary

Term	Description
AADF	Average Annual Daily Traffic
ALC	Agricultural Land Classification
AM	AM peak hour (8-9am)
AMCB	Analysis of Monetised Costs and Benefits
ANPR	Automatic Number Plate Recognition
AONB	Areas of Outstanding Natural Beauty
AQMA	Air Quality Management Area
ASR	Appraisal Specification Report
AST	Appraisal Summary Table
BAP	Biodiversity Action Plan
BCR	Benefit cost ratio. Calculated as the PVB divided by the PVC
Capacity	The ability of a highway link or junction to carry or accommodate traffic flow
CO2	Carbon Dioxide
CCTV	Closed-Circuit Television
CPO	Compulsory Purchase Order
CSD	Commercial Services Division
DfT	Department for Transport
DM	Do Minimum – The modelled scenario which excludes the proposed intervention
DMRB	Design Manual for Roads and Bridges
DS	Do Something – The modelled scenario which includes the proposed intervention
EAST	Early Assessment and Sifting Tool
ERT	Emergency
GVA	Gross Value Added, a measure of economic output
HATRIS	Highways Agency Traffic Information System
HGV	Heavy Goods Vehicle
HST	Highways Strategic Transformation Programme
IP	Inter peak hour (12-1pm)
JTDB	Journey Time Database
KSI	Killed/Seriously Injured
LEP	Local Enterprise Partnership
LNR	Local Nature Reserve
LTP3	Local Transport Plan 3
MIDAS	Motorway Incident Detection and Automatic Signalling
NCA	National Character Area

Term	Description
NCN	National Cycle Route
NDD	Network Delivery and Development directorate
NNR	National Nature Reserves
NO_2	Nitrogen Dioxide
NPPF	National Planning Policy Framework
NTEM	National Trip End Model
NVZ	Nitrate Vulnerable Zone
OAR	Option Assessment Report
ONS	Office for National Statistics
ORR	Office of Rail Regulation
PCF	Project Control Framework
PQC	Pavement Quality Concrete
ProW	Public Rights Of Way
PVB	Present Value Benefit. The 69onetized benefit of a scheme expressed in real terms, typically given in 2010 prices and values
RBS	Route Based Strategies
RIS	Roads Investment Strategy
RTF	Road Traffic Forecast
SAC	Special Areas of Conservation
SDP	Sustainable Development Plan
SEP	Strategic Economic Plan
SHMA	Strategic Housing Market Assessment
SOBC	Strategic Outline Business Case
SPA	Special Protection Areas
SPZ	Source Protection Zone
SRN	Strategic Road Network
SSD	Sight Stopping Distances
TAG	Transport Analysis Guidance, published by the Department for Transport (see also WebTAG)
TEE	Transport Economic Efficiency
TEMPRO	Trip End Model Presentation Program – modelling tool designed to allow users to look at the growth in trip ends, using actual and forecast data supplied by the DfT
TRADS	Highways England Traffic Information Database
TSCS	Thin Surface Course Systems
TSD	Traffic speed deflectometer
V/C	Volume/Capacity ratio
VfM	Value for Money

Term	Description
VMS	Variable Message Sign
WebTAG	The Department for Transport guidance document on the conduct of transport studies (see also TAG)

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Appendix B. A14 Traffic model assessment

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Memorandum

1 City Walk
Leeds, West Yorkshire LS11 9DX
United Kingdom
T +44 (0)113 242 6771
F +44 (0)113 389 1389
www.jacobs.com

Date	10th November 2015
To	Highways England TAME
From	Daragh Foley / Richard Smith
Subject	**Use of A14 Traffic Model in A428 Assessment**

1. Background

The A428 is a strategic route for vehicles travelling east-west between Oxford and Cambridge, via urban settlements including Milton Keynes and Bedford. The A428 extends approximately 17 miles between the A1 and A14/M11. Between the Black Cat roundabout on the A1 and its interchange with the A1198 at Caxton Gibbet, the route is of single carriageway standard. Previous studies have highlighted the severe lack of capacity on this section.

Jacobs have been commissioned by Highways England to progress a study relating to the A428 between Black Cat and Caxton Gibbet through their Project Control Framework (PCF) Stage 0 process. This includes updating an existing WebTAG Stage 1 Option Assessment Report (OAR) and Strategic Outline Business Case (SOBC).

2. Purpose of Note

Jacobs' study will identify the future traffic situation on the route if no intervention is made, and assess the traffic impacts of several potential options for intervention. Existing traffic models could provide a source of evidence to inform this assessment and be suitable for use moving into later PCF stages.

A traffic model has recently been developed to support the nearby A14 Cambridge to Huntingdon improvement scheme. This note will investigate to what extent the A14 model can be used to support later stages of the A428 study.

3. Overview of A14 Traffic Model

The A14 traffic model was developed to support the A14 Cambridge to Huntingdon improvement scheme, which proceeded through a Development Consent Order (DCO) statutory process. The model uses the SATURN modelling software. The most recent version of the model was developed with a base year of 2014, and forecast years of 2020, 2031, 2035 and 2041. The model represents the following time periods:

- Weekday AM Peak (08:00-09:00)
- Weekday Interpeak (average hour between 10:00-16:00)
- Weekday PM Peak (17:00-18:00)

The model includes a 'Fully Modelled Area' which is shown in Figure 1. This area consists of simulation network coding (i.e. delays at junctions are considered within the model). Within this the

'Area of Detailed Modelling' is coded in the highest level of detail, while the rest of the Fully Modelled Area is coded in slightly less detail.

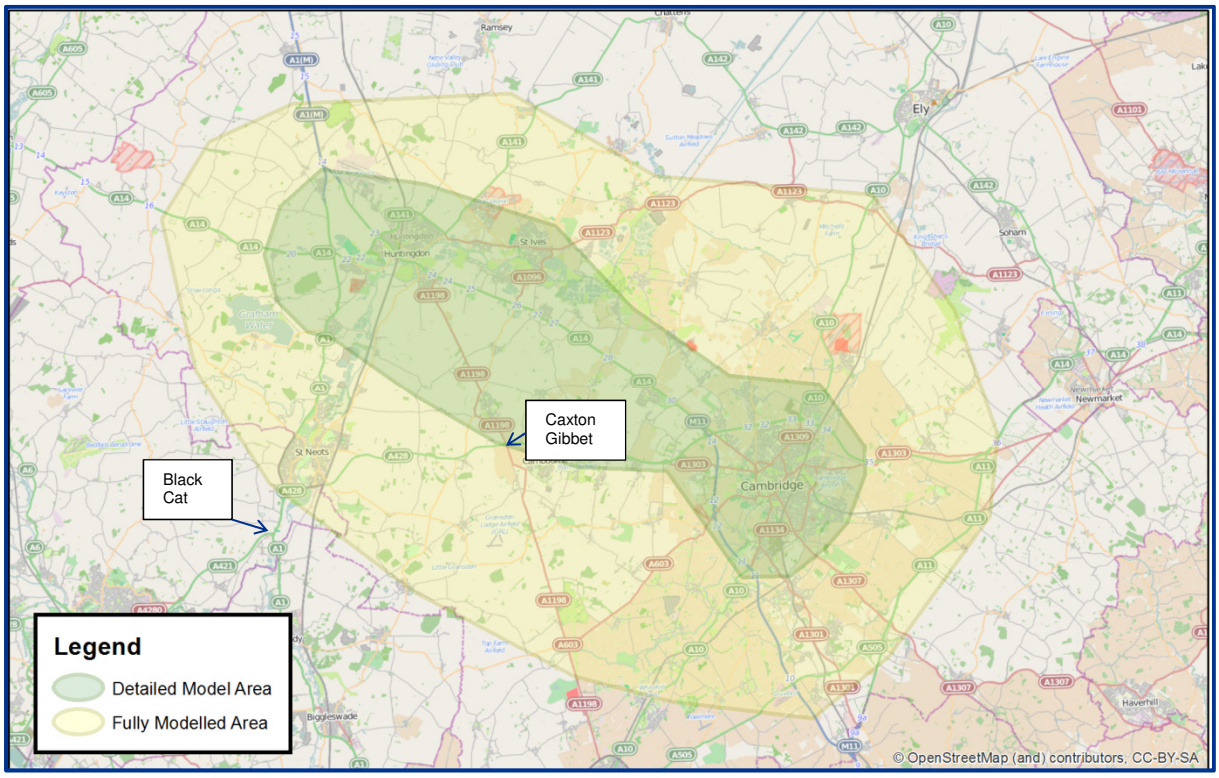

Figure 1 : A14 Model – Fully Modelled Area

Caxton Gibbet junction is included within the Detailed Model Area, while the A428 between Caxton Gibbet and Black Cat roundabout is within the rest of the Fully Modelled Area.

The area of the model outside the Fully Modelled Area is known as the 'External Area'. This is coded in less detail, with no junction delay included. Black Cat roundabout and the rest of the A428 east of this lie within the External Area. Any delays caused by Black Cat roundabout are therefore not specifically included within the A14 model. Speed-flow curves are used in the External Area as a proxy for junction delay.

4. Validation of A14 Model

In order to establish confidence in a traffic model, a comparison should be made between modelled and observed traffic data. A validation exercise was undertaken as part of the development of the A14 model. It was considered that overall the model validated well enough to be able to assess the impact of the A14 Cambridge to Huntingdon scheme.

However, this validation considered the model over a wide geographic area, with particular focus on the A14. In order to use this model to inform a continued A428 assessment into PCF Stages 1 and 2, we must focus on the performance of the model around the A428 itself. The validation around the A428, in terms of both traffic flows and speeds, is discussed below.

Link Flow Validation

Link flows predicted by a traffic model should be compared against link flows observed during traffic counts. WebTAG Unit M3.1 specifies the criteria that a model should meet in terms of flow validation:

- *For flow validation a statistic known as 'GEH' should be derived, which is based on both the relative and absolute error in modelled flows. WebTAG guidance suggests that GEH should be <5 for at least 85% of modelled links.*

The link flow validation for each modelled time period, as reported in the A14 Local Model Validation Report (March 2015), is shown in Figure 2 to Figure 4 below. This compares model flow against observed traffic counts, two of which are on the A428 between Black Cat and Caxton Gibbet, either side of the junction with the B1428 to St Neots.

Other than those reported in the figures below, no extra observed traffic counts are available with which to undertake further validation.

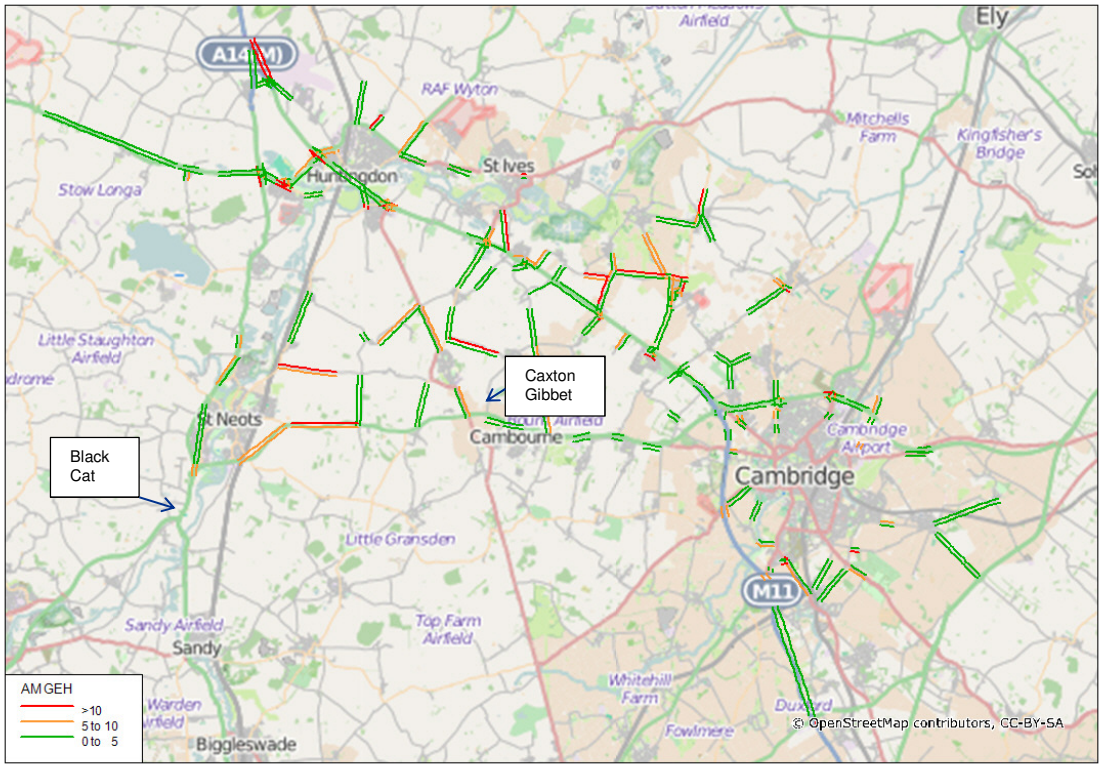

Figure 2 : Link Flow Validation – AM Peak

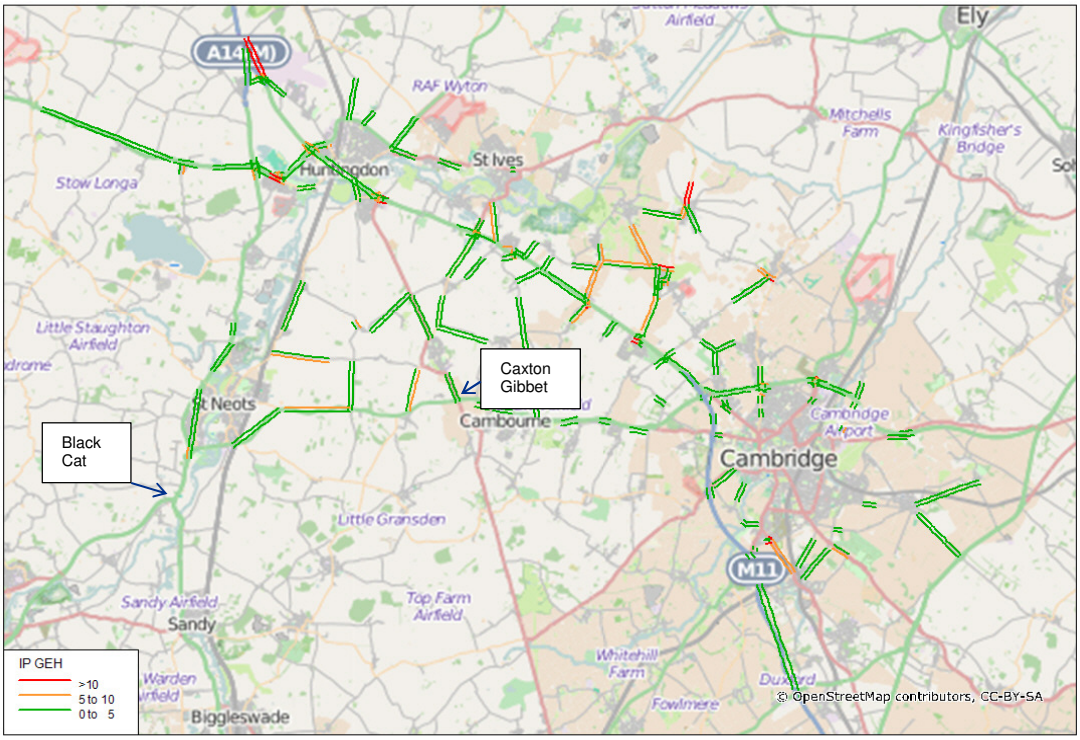

Figure 3 : Link Flow Validation – Interpeak

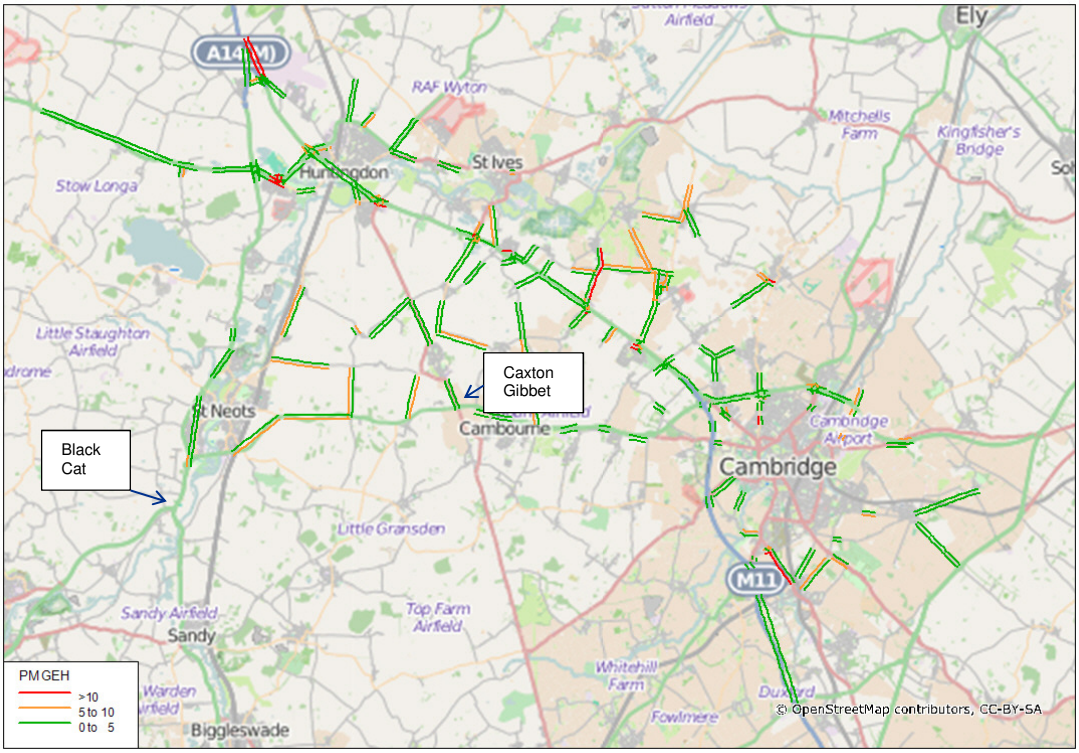

Figure 4 : Link Flow Validation – PM Peak

The figures above show that in the Interpeak and PM peak, validation on the A428 between Black Cat and Caxton Gibbet is within – or just outside – the GEH criteria set out in WebTAG. However, in the AM peak the validation is poor. None of the links on the A428 between Black Cat and Caxton Gibbet meet the GEH criteria, with one being considerably outside the criteria.

On all other nearby roads, including sections of the A428 to the east of Caxton Gibbet, validation is generally good.

Journey Time Validation

Journey times predicted by a traffic model should be compared against journey times over set routes observed in traffic surveys. WebTAG Unit M3.1 specifies the criteria that a model should meet in terms of journey time validation:

- *For journey time validation, the percentage difference between observed and modelled time over set routes should be measured. Modelled times should be within 15% of observed times for at least 85% of routes.*

The journey time routes used for validation in the A14 Local Model Validation Report (LMVR) are shown in Figure 5 below.

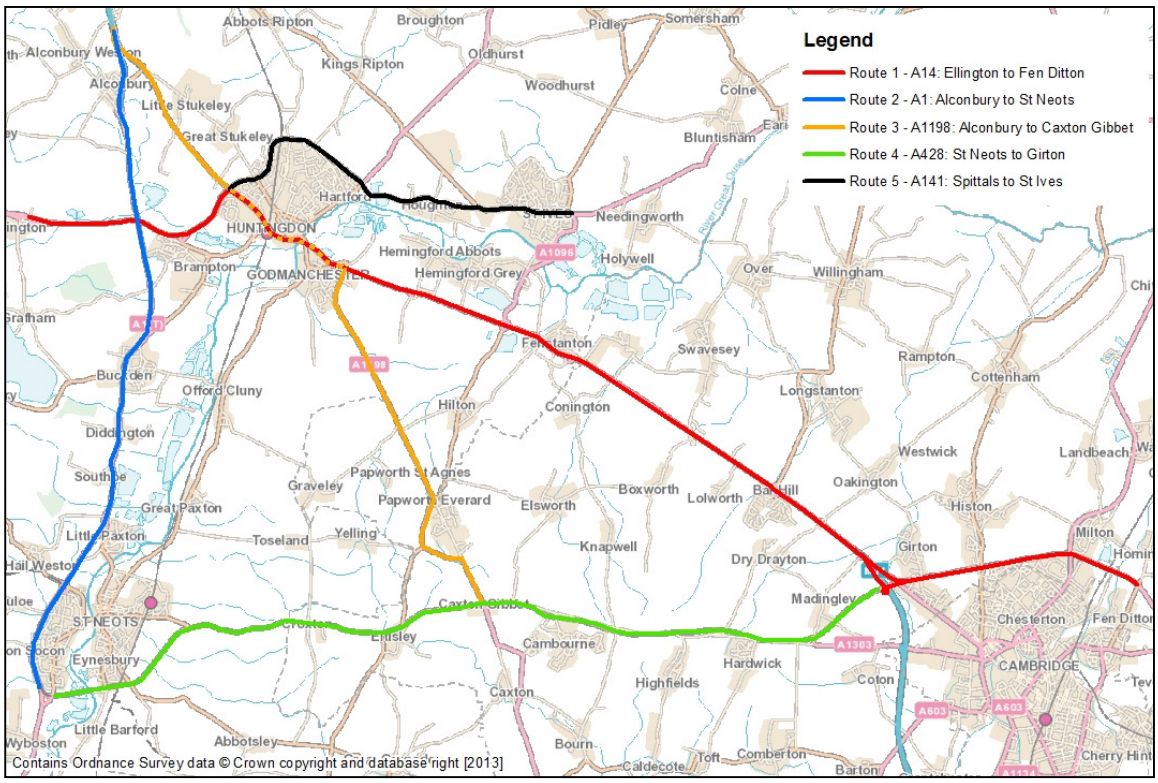

Figure 5 : Journey Time Validation Routes used in A14 LMVR

Route 4 (the green route in the figure above) consists of the A428 from Girton to the junction with the A1 at Wyboston. The journey time validation on this route is shown in Table 1 below.

	Eastbound			Westbound		
	AM	IP	PM	AM	IP	PM
Observed Journey Time (s)	1,447	1,146	1,163	1,244	1,132	1,201
Modelled Journey Time (s)	1,607	1,191	1,223	1,266	1,175	1,418
Difference (s)	160	45	60	22	43	217
% Difference	11%	4%	5%	2%	4%	18%
WebTAG compliant?	Yes	Yes	Yes	Yes	Yes	No

Table 1 : Journey Time Validation results from A14 LMVR: A428 route

All journey times on the A428 meet WebTAG validation criteria except for westbound in the PM period. Although the model consistently predicts longer journey times than those observed, in the majority of cases the difference is less than 5%.

5. Use of the model in A428 assessment

The advantages of the continued use of the A14 model for the A428 assessment is that the model is mature and considered well validated for its application to the A14 proposals. Relatively modest additional work could be undertaken to extent the simulation coding area, supplement the model with additional count data if necessary, and rerun calibration/validation to achieve a model that performs well overall, but achieves acceptable levels of fit with traffic volumes and journey time.

Appendix C. Capacity Analysis

Capacity = [A – B * Pk%H]

Where, Pk%H is the percentage of 'Heavy Vehicles' in the peak hour

A and B are parameters dependant on the road standard;

Road Type	A	B
Single Carriageway	1380	15.0
Dual Carriageway	2100	20.0
Motorway	2300	25.0

A428 (1 Lane)

= [1380 – 15.0 * 11.7]

= 1204.5

A1 (2 Lane)

=[2100-20*12.5]

=1850

Appendix D. Buffer Index as a measure of journey time reliability

The buffer index is described by the U.S. Federal Highway Administration as:

The extra time (or time cushion) that travellers must add to their average travel time when planning trips to ensure on-time arrival.

For example, a buffer index of 40 percent means that for a trip that usually takes 20 minutes a traveller should budget an additional 8 minutes to ensure on-time arrival most of the time.

Average travel time = 20 minutes
Buffer index = 40 percent
Buffer time = 20 minutes × 0.40 = 8 minutes

The 8 extra minutes is called the buffer time. Therefore, the traveller should allow 28 minutes for the trip in order to ensure on-time arrival 95 percent of the time. (FWHA)

The buffer index is calculated using the following equation:

$$For\ a\ specific\ route\ and\ time\ period:$$

$$Buffer\ index\ (\%) = \frac{95^{th}\ percentile\ travel\ time - average\ travel\ time}{average\ travel\ time}$$

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Appendix E. Environmental Constraints Plan

N
W E
S

Deserted village of Boughton
Little Paxton Wood
Little Paxton Pits
River Kym / Till
River Great Ouse and Backwaters
St. Neot's Common
Fox Brook
Hen Brook
East Coast Mainline
Bedford
St Neots Priory
The Malting (kiln)
ST NEOTS
The Hillings
WYBOSTON
GALLOW HILL
Moated enclosure and associated building platforms
Chawston Manor
BLACK CAT
Bowl barrow
Tempsford Bridge
Gannocks Castle
River Ivel / Hiz / Purwell
Blunham Bridge
Biggin Wood
Story Moats
THE HAZELLS
Huntingdonshire
Central Bedfordshire
South Cambridgeshire
Moated site
CAMBRIDGE ROAD (ST NEOTS)
Deserted village
Deserted village
Croxton deserted medieval village
CROXTON PARK
Moated site at Pond Farm
Moated site at Manor Farm
CAXTON GIBBET
Moated site at Pastures Farm
Caxton Moats
Bourn Windmill
Papworth Wood
Moated site
Elsworth Wood
LONGSTOWE HALL
BOURN HALL
Great Gransden Windmill
Waresley Wood
Weaveley and Sand Woods
Weaveley
Gamlingay

0 1 2 3 4 Kilometres

Photo 5

Photo 6

Legend

- Study Area
- Approximate Route Corridor
- Proposed Junction Improvements
- Listed Buildings
- Rivers
- Local Planning Authority Boundary
- Scheduled Monuments
- Flood Zone 3
- Flood Zone 2
- Current Landfill Sites
- Historic Landfill Sites
- Registered Parks
- Sites of Special Scientific Interest
- Noise Important Areas

Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
0	26/10/2015	Initial Issue	CB	CW	IC	SB

JACOBS
1180 Eskdale Road, Winnersh, Reading, RG41 5TU, UK.
Tel: +44 (0)118 946 7000
www.jacobs.com

Client: highways england driving forward

Project: A428 BLACK CAT TO CAXTON GIBBET

Drawing Title: A428 CONSTRAINTS PLAN

Scale @ A3	1:55,000	DO NOT SCALE
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Appendix F. Long List of Options

A - Online Options	Description
1	A428 full widening
2	A428 localised widening
3	Grade separation at Caxton Gibbet Roundabout
4	Signalisation of existing roundabout at Caxton Gibbet
5	Signalisation and 'hamburger' style roundabout at Caxton Gibbet
6	Circulatory Capacity Increases (3 lanes) at Caxton Gibbet
7	Small scale signing and lining improvements at Caxton Gibbet
8	Upgrade (Signalisation) to existing A428 junctions
9	Grade separation at Black Cat
10	Signalised T-Junction at Black Cat
11	Dualling between Wyboston and Barford Road
12	Jetlane (x2) A428 to A1 (S) at Wyboston Roundabout
13	Upgrade to existing A1 junctions
14	Small scale improvements (Rationalisation of local roads accessing the A428 (eg, High St, Abbotsley Rd), prohibition of right-turn movements, signing and lining enhancements)
15	Driver advisory Signs (VMS)
16	Dualling between Barford Road and Cambridge Road Roundabout
17	Dualling between Cambridge Road and Caxton Gibbet
18	Dualling between St Ives Junction (B1040) and Caxton Gibbet
19	Widening the A1 between Wyboston and Black Cat
20	Tidal Flow lane on A428 providing additional capacity eastbound in the AM and westbound in the PM (zipper mechanism)

B - Offline Options	
1	Full offline dualling
2	Full offline single carriageway
3	Free-flow link between A1 and A428
4	A1 realignment west of St. Neots
5	A1 realignment east of St. Neots
6	A428 bypass to Cambridge Road Roundabout
C - Combined Package Options	
1	A428 full offline dualling, grade separation of Black Cat roundabout and grade separation of Caxton Gibbet roundabout
2	A428 full offline dualling, grade separation of Black Cat roundabout and signalisation of Caxton Gibbet roundabout
3	A428 bypass to Cambridge Road roundabout, grade separation at Caxton Gibbet, grade separation at Black Cat, local widening with channelisation between Cambridge Road roundabout and Caxton Gibbet
4	A428 bypass to Cambridge Road roundabout, signalisation at Caxton Gibbet, grade separation at Black Cat, local Widening with channelisation between Cambridge Road Roundabout and Caxton Gibbet
5	A428 bypass to Cambridge Road roundabout, grade separation at Black Cat, grade separation at Caxton Gibbet
6	A428 bypass to Cambridge Road roundabout, grade separation at Black Cat, signalisation at Caxton Gibbet
7	A428 single lane carriageway bypass to Cambridge Road roundabout, online dualling between Cambridge Road roundabout and Caxton Gibbet roundabout, improvements at Black Cat roundabout and Caxton Gibbet roundabout
8	A428 full online dualling with grade separation at Black Cat roundabout and grade separation at Caxton Gibbet roundabout
9	A428 full online dualling, grade separation at Black Cat roundabout and signalisation at Caxton Gibbet roundabout
10	Local junction widening with channelisation at existing A428 junctions, grade separation at Caxton Gibbet roundabout, grade separation at Black Cat and upgrade to existing A1 junctions
11	Local junction widening with channelisation at existing A428 junctions,

	Signalisation at Caxton Gibbet roundabout, grade separation at Black Cat and upgrade to existing A1 junctions
12	Online dualling of the A428 between St Ives Road and Caxton Gibbet and grade separation of Caxton Gibbet roundabout
13	Online dualling of the A428 between St Ives Road and Caxton Gibbet roundabout and signalisation of Caxton Gibbet roundabout
14	Grade separation of Black Cat roundabout and signalisation of Caxton Gibbet
15	Local junction widening with channelisation along A428 and signalisation of Caxton Gibbet
16	A428 dual carriageway bypass to Cambridge Road roundabout with online dualling between Cambridge Road roundabout and Caxton Gibbet roundabout, grade separation at Black Cat roundabout and grade separation at Caxton Gibbet roundabout
17	Dual carriageway bypass from Black Cat roundabout and Caxton Gibbet roundabout, and grade separation of Caxton Gibbet roundabout
D - Public Transport Options	
1	Reinstate East - West Rail Link
2	Park and Ride at St. Neots
3	Tram services
4	Bus service improvements
5	Guided bus way extension
E - NMU Options	
1	Segregated Cycle lanes
2	Improved pedestrian walkways

Appendix G. Sifting Process

G.1 Introduction

The Option Generation process (Chapter 7) identified an initial list of potential interventions to be considered further as part of the feasibility study.

The key principle of TAG is that potential improvements are driven by identified problems and defined objectives. This ensures that the need for investment can be clearly justified and evidenced.

The next stage within the option development process was therefore to 'sift out' any potential solutions that clearly failed to meet the defined objectives, fail to alleviate identified problems or fail to meet key deliverability / feasibility criteria.

DfT guidance recommend the use of the Early Assessment and Sifting Tool (EAST) which enables analysts to quickly assess options against the Treasury Five Case Model to discard any options that do not represent realistic solutions or are undeliverable. An example of EAST is provided in Figure G.1.

However, a limitation of EAST in the context of the Feasibility Study is that there is only a single opportunity to provide an assessment against the identified problems and objectives. As shown below these assessments are covered under 'Scale of Impact' for problems and 'Fit with other objectives' for route objectives.

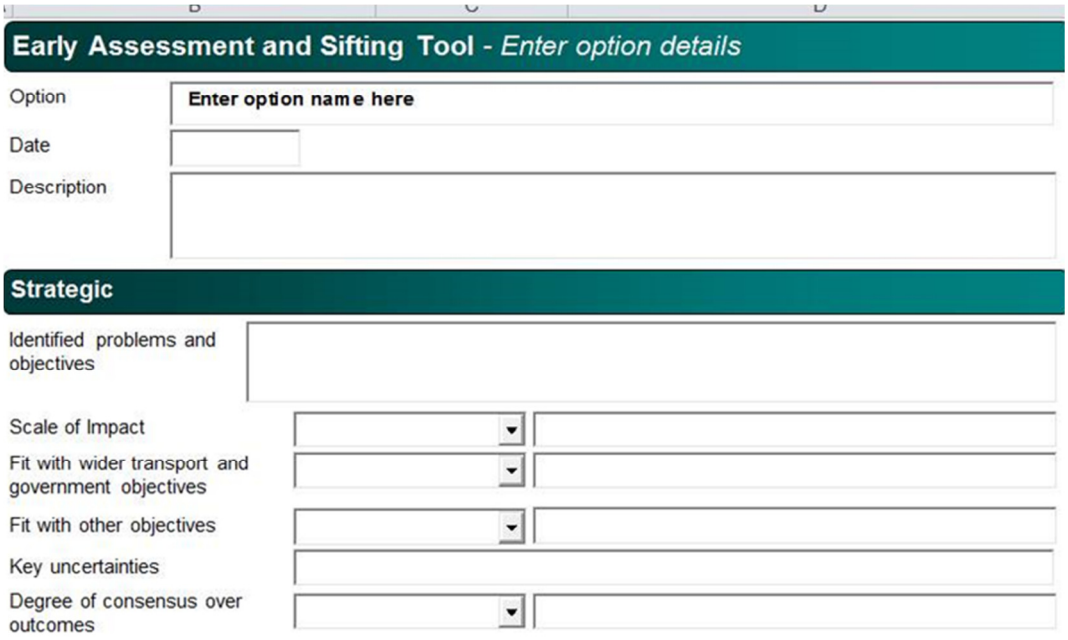

Figure G.1 : EAST Input (Scale of Impact / fit with other objectives)

Given that the feasibility study has identified several problems and objectives it is considered that a single assessment could be misleading and provide limited disaggregation between the benefits of each of the potential interventions considered. A spreadsheet has therefore been used in advance of EAST in order to better understand how each of the potential interventions could alleviate each of the identified problems and contribute to the defined objectives. This 'Initial Sift' spreadsheet has also included consideration of high level deliverability and feasibility criteria in order to identify any 'show stoppers' that are likely to prevent an option from being progressed.

The Initial Sift is discussed in more detail below, followed by a description of EAST.

G.2 Initial Sift

The Initial Sift spreadsheet includes the following components.

- Assessment against problems
- Assessment against objectives
- Feasibility / deliverability assessment
- Sifting criteria and sift

Each element of the Initial Sift is discussed in more detail below followed by a summary of the sifting process.

G.2.1 Initial Sift: Assessment against problems and objectives

Each of the potential interventions identified for further consideration were input into the initial sifting spreadsheet. Each intervention was assessed against how it may help to resolve the identified problems on the route and help achieve the defined objectives.

This exercise was undertaken by specialists from Transport Planning / Appraisal, Highway Design and Environmental disciplines and was based upon local knowledge, technical expertise, professional judgement and experience.

The assessment was undertaken using a five-point scale as illustrated in Figure G.2.

Reference (Route Section-Intervention)	Option Description	Problems (EAST Scale of Impact)												Objectives (EAST Fit with Other Objectives)								
		1	2	3	4	5	6	7	8	9	10	11	Total	1	2	3	4	5	6	7	8	Total
Online Options																						
1	A428 full widening	0	0	-1	1	2	2	1	2	0	0	2	9	1	-1	-1	2	2	2	0	2	5
2	A428 localised widening	0	0	0	1	1	1	1	0	0	0	1	5	0	0	0	1	0	1	0	1	2
3	Grade separation @ Caxton R'bt	0	0	0	1	1	1	0	0	0	1	1	5	1	0	0	1	0	1	0	1	3
4	Signalisation of existing roundabout @ Caxton Gibbet	0	0	1	1	1	1	1	0	0	1	1	7	1	1	1	1	0	1	0	1	5
5	Signalisation and 'hamburger' style rbt @ Caxton Gibbet	0	0	1	1	1	1	1	0	0	1	1	7	1	1	1	1	0	1	0	1	5
6	Circulatory Capacity Increases (3 lanes) @ Caxton Gibbet	0	0	-1	1	1	1	1	0	0	0	1	4	0	0	-1	1	0	1	0	1	1
7	Small scale signing and lining improvements @ Caxton Gibbet	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	2
8	Upgrade (Signalisation) to existing A428 junctions	0	0	1	1	1	1	1	0	0	1	1	7	1	1	1	1	0	1	0	1	5
9	Grade separation @ Black Cat	0	0	0	1	1	0	1	0	0	1	1	5	1	1	0	1	0	1	0	1	4

Figure G.2 : Scoring against problems and objectives

The resulting assessment provided a high level understanding of the potential benefits that could be delivered by each of the potential interventions.

G.2.2 Initial Sift: Feasibility / deliverability assessment

The next stage was to assess each of the potential interventions against key deliverability and feasibility criteria as listed below. Again, this exercise was undertaken by specialists from Transport Planning / Appraisal, Highway Design and Environmental disciplines and was based upon local knowledge, technical expertise, professional judgement and experience.

Deliverability Considerations

1) Political acceptability

   a) Who are the key stakeholders?

   b) What level of support is there likely to be from them for the option under consideration?

   c) What level of support is there likely to be from the public for the option under consideration?

   d) Are there any significant environmental impacts for the option under consideration?

2) Planning

   a) How far through the planning process is the option under consideration (e.g. not started, part-way through, nearing completion)?

   b) Are there any legal issues e.g. CPO?

3) Implementation timescales / funding likelihood

   a) What is the implementation timescale (e.g. short (less than 2 years), medium (2 to 5 years) and long (greater than 5 years))?

   b) What are the likely funding sources? Are they time-dependent? Is there likely to be a funding gap?

   c) Are there likely to be significant mitigation costs over and above the cost of the option itself?

4) Third Party Issues

   a) Is Third Party land required?

   b) Are there any legal issues e.g. CPO?

Feasibility Considerations

1) Physical constraints

   a) Are there any significant physical constraints that could have a direct impact on the costs and risks associated with the option under consideration e.g. existing structures (viaducts, bridges, retaining walls etc.) or structures required within option design?

2) Land ownership / availability

   a) Will CPO be required?

3) Design standards

   a) Is the option under consideration technically possible from an engineering perspective?

Each of the potential interventions were assessed against a three-point scale as illustrated in Figure G.3.

See end of sheet for identified problems and objectives. See Intervention Matrix (Sheet 2) for Intervention Codes.		**Deliverability** (e.g. political, planning, timescale or third party issues)	**Feasibility** (e.g. physical constraint, land availability and design standards)
		Likely to be deliverable	Likely to be feasibile
		Likely to be deliverable (with Challenges)	Likely to be feasibile (with Challenges)
		Unlikely to be deliverable	Unlikely to be feasible
Reference (Route Section-Intervention)	**Option Description**	**Deliverability**	**Feasibility**
Online Options			
1	A428 full widening	Likely to be deliverable (with Challenges)	Likely to be feasibile (with Challenges)
2	A428 localised widening	Likely to be deliverable (with Challenges)	Likely to be feasibile
3	Grade separation @ Caxton R'bt	Likely to be deliverable (with Challenges)	Likely to be feasibile (with Challenges)
4	Signalisation of existing roundabout @ Caxton Gibbet	Likely to be deliverable	Likely to be feasibile
5	Signalisation and 'hamburger' style rbt @ Caxton Gibbet	Likely to be deliverable	Likely to be feasibile
6	Circulatory Capacity Increases (3 lanes) @ Caxton Gibbet	Likely to be deliverable	Likely to be feasibile
7	Small scale signing and lining improvements @ Caxton Gibbet	Likely to be deliverable	Likely to be feasibile
8	Upgrade (Signalisation) to existing A428 junctions	Likely to be deliverable	Likely to be feasibile

Figure G.3 : Scoring against deliverability and feasibility

G.2.3 Initial Sift: Sifting Criteria and Sift

A set of sifting criteria was developed to sift-out potential interventions that were unlikely to provide a significant contribution to the identified problems and defined objectives or were unlikely to be deliverable or feasible. The sifting criteria is illustrated in Figure G.4.

Initial Sifting Criteria

Each option must meet the following sifting criteria to be considered further within EAST:

1: Overall moderate impact against identified problems (Appraisal score >3, see East Conversion below)
2: Overall moderate fit with route objectives (Appraisal score >3, see East conversion below)
3: Likely to be deliverable
4: Likely be feasible in theory

Initial Sifting Criteria Prior to EAST				Take to EAST
1	2	3	4	
A - Making best use of the existing junction footprint				
✗	✓	✓	✓	✗
✗	✗	✓	✓	✗
✗	✗	✓	✓	✗
✗	✗	✓	✓	✗
✗	✗	✓	✓	✗
✓	✓	✓	✓	✓

Figure G.4 : Initial sifting criteria

Only those potential interventions that met all 4 sifting criteria were selected for further consideration within EAST.

G.3 Early Assessment and Sifting

Each of the options that remained after the 'initial sift' were then assessed within EAST against the Treasury Five Case Model as summarised below.

- Strategic Case
  - Identified problems and objectives of the option
  - Scale of Impact
  - Fit with wider transport and Government objectives
  - Fit with other objectives
  - Key uncertainties
  - Degree of consensus over outcomes
- Economic Case
  - Economic Growth
  - Carbon Emissions
  - Socio-distributional impacts and the regions
  - Local Environment
  - Well Being
  - Expected Value for Money Category
- Management Case
  - Implementation timetable from inception to delivery
  - Public acceptability
  - Practical feasibility
  - Quality of supporting evidence
  - Key risks
- Financial Case
  - Affordability
  - Capital Costs
  - Revenue Costs
  - Cost Profile
  - Overall Cost Risk
- Commercial Case
  - Flexibility of Option
  - Where is funding coming from?
  - Any Income generated?

EAST does not determine the best performing options on the user's behalf but simply enables the project team to view all the options' scores when looking at the summary sheet.

Once EAST had been populated the project team therefore had to determine which, if any, options should not be taken any further forward. A summary of EAST is provided in Table 11.1.

Option	Strategic			Economic						Managerial			Financial			Commercial
	Scale of Impact [illegible]	transport and government objectives	Fit with other objectives	Economic Growth	Carbon Emissions	Socio-distributional and the regions	Local Environment	Wellbeing	Expected VFM	Implementation time table	Public Acceptability	Practical Feasibility	Affordability	Capital Cost	Overall Risk	Flexibility of Option
Option A1	3	4	3	4	3	4	3	3	Medium	5-10 years	3	3	3	£500-1000	3	3
Option B1	4	4	3	4	3	4	2	4	Medium	5-10 years	4	5	2	£500-1000	5	2
Option C1	4	4	3	5	3	4	2	4	High	5-10 years	4	5	2	£500-1000	5	3
Option C2	4	4	3	4	3	4	2	4	High	5-10 years	4	5	2	£500-1000	5	3
Option C3	4	4	3	4	3	4	3	4	High	5-10 years	2	4	3	£500-1000	5	4
Option C4	4	4	3	3	3	4	3	4	High	5-10 years	2	4	3	£500-1000	5	4
Option C5	4	4	3	4	3	4	3	4	High	5-10 years	2	5	4	£250-500	5	3
Option C6	3	4	3	3	3	4	3	4	High	5-10 years	2	5	4	£250-500	5	3
Option C7	4	4	3	4	3	4	3	4	High	5-10 years	3	5	4	£250-500	3	4
Option C8	4	4	3	4	3	4	3	4	Medium	5-10 years	3	3	3	£500-1000	3	4
Option C9	4	4	3	3	3	4	3	4	Medium	5-10 years	3	3	3	£500-1000	3	3
Option C10	3	3	3	4	3	4	3	4	Medium	5-10 years	1	3	5	£100-250	3	5
Option C11	3	3	3	3	3	4	3	4	Medium	5-10 years	1	5	5	£100-250	3	5
Option C13	3	3	3	2	3	3	3	3	Medium	5-10 years	1	5	5	£50-100	3	3
Option C14	3	3	3	3	3	3	3	4	Medium	5-10 years	1	5	5	£50-100	3	3
Option C16	4	4	3	5	3	4	2	4	High	5-10 years	3	5	2	£500-1000	3	4

Table 11.1 : EAST Summary

Following a review of EAST it was identified that all of the options fell within the allowed £1bn budget, however, some of the schemes were cheaper than others, and the more expensive scheme were generally expected to provide bigger scale of impacts.

G.4 Shortlisted Options

The following shortlist was considered to comprise distinct and feasible (or potential) options for further development and assessment.

- Option C1 - A428 full offline dualling with grade separation of Black Cat roundabout and grade separation of Caxton Gibbet roundabout;
- Option C2 - A428 full offline dualling with grade separation of Black Cat roundabout and signalisation of Caxton Gibbet roundabout;
- Option C5 - A428 bypass to Cambridge Road roundabout with grade separation at Black Cat, and grade separation at Caxton Gibbet roundabout;
- Option C6 - A428 bypass to Cambridge Road R'bout with grade separation at Black Cat roundabout, and signalisation at Caxton Gibbet roundabout;
- Option C7 - A428 single lane carriageway bypass to Cambridge Road roundabout with online dualling between Cambridge Road roundabout and Caxton Gibbet roundabout, grade separation at Black Cat roundabout and grade separation at Caxton Gibbet roundabout;
- Option C10 - Local junction widening with channelisation at existing A428 junctions, grade separation at Caxton Gibbet roundabout, grade separation at Black Cat roundabout and upgrade to existing A1 junctions;
- Option C11 - Local junction widening with channelisation at existing A428 junctions, signalisation at Caxton Gibbet roundabout, grade separation at Black Cat roundabout and upgrade to existing A1 junctions; and
- Option C16 - A428 dual carriageway bypass to Cambridge Road roundabout with online dualling between Cambridge Road roundabout and Caxton Gibbet roundabout, grade separation at Black Cat roundabout and grade separation at Caxton Gibbet roundabout

Appendix H. Initial Sift Tool

A428 Black Cat roundabout to Caxton Gibbet roundabout

Initial Sift of Options
(Draft Criteria for Approval)

See end of sheet for identified problems and objectives.
See Intervention Matrix (Sheet 2) for Intervention Codes.

Qualitative assessment against identified problems	
2	Large beneficial impact
1	Beneficial impact
0	Neutral / marginal impact
-1	Adverse impact
-2	Large adverse impact

Qualitative assessment against identified objectives	
2	Large beneficial impact
1	Beneficial impact
0	Neutral / marginal impact
-1	Adverse impact
-2	Large adverse impact

Deliverability (e.g. political, planning, timescale or third party issues)
Likely to be deliverable
Likely to be deliverable (with Challenges)
Unlikely to be deliverable

Feasibility (e.g. physical constraint, land availability and design standards)
Likely to be feasibile
Likely to be feasibile (with Challenges)
Unlikely to be feasible

Initial Sifting Criteria
Each option must meet the following sifting criteria to be considered further within EAST:
1: Overall moderate impact against identified problems (Appraisal score >4, see East Conversion below)
2: Overall moderate fit with route objectives (Appraisal score >3, see East conversion below)
3: Likely to be deliverable
4: Likely be feasible in theory

Reference (Route Section-Intervention)	Option Description	Problems (EAST Scale of Impact)											Objectives (EAST Fit with Other Objectives)									Deliverability	Feasibility	Initial Sifting Criteria Prior to EAST				Take to EAST
		1	2	3	4	5	6	7	8	9	10	Total	1	2	3	4	5	6	7	8	Total			1	2	3	4	
A - Online Options																												
1	A428 full widening	0	0	-1	1	2	2	1	2	0	2	9	1	2	2	2	-1	-1	0	2	7	Likely to be deliverable (with Challenges)	Likely to be feasibile (with Challenges)	✓	✓	✓	✓	✓
2	A428 localised widening	0	0	0	1	1	1	1	0	0	1	5	0	1	1	1	0	0	0	0	3	Likely to be deliverable (with Challenges)	Likely to be feasibile	✗	✗	✓	✓	✗
3	Grade separation @ Caxton Gibbet R'bt	0	0	0	1	1	1	0	0	0	1	4	1	1	1	1	0	0	0	0	4	Likely to be deliverable (with Challenges)	Likely to be feasibile (with Challenges)	✗	✗	✓	✓	✗
4	Signalisation of existing roundabout @ Caxton Gibbet	0	0	1	1	1	1	1	0	0	1	6	1	1	1	1	1	1	0	0	6	Likely to be deliverable	Likely to be feasibile	✗	✓	✓	✓	✗
5	Signalisation and 'hamburger' style rbt @ Caxton Gibbet	0	0	1	1	1	1	1	0	0	1	6	1	1	1	1	1	1	0	0	6	Likely to be deliverable	Likely to be feasibile	✗	✓	✓	✓	✗
6	Circulatory Capacity Increases (3 lanes) @ Caxton Gibbet	0	0	-1	1	1	1	1	0	0	1	4	0	1	1	1	0	-1	0	0	2	Likely to be deliverable	Likely to be feasibile	✗	✗	✓	✓	✗
7	Small scale signing and lining improvements @ Caxton Gibbet	0	0	0	1	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	2	Likely to be deliverable	Likely to be feasibile	✗	✗	✓	✓	✗
8	Upgrade (Signalisation) to existing A428 junctions	0	0	1	1	1	1	1	0	0	1	6	1	1	1	1	1	1	0	0	6	Likely to be deliverable	Likely to be feasibile	✗	✓	✓	✓	✗
9	Grade separation @ Black Cat	0	0	0	1	1	0	1	0	0	1	4	1	1	1	1	1	0	0	0	5	Likely to be deliverable (with Challenges)	Likely to be feasibile (with Challenges)	✗	✓	✓	✓	✗
10	Signalised T-Junction @ Black Cat	0	0	1	0	0	0	0	0	0	1	2	0	0	0	0	0	1	0	0	1	Likely to be deliverable	Likely to be feasibile	✗	✗	✓	✓	✗
11	Dualling between Wyboston and Barford Road	0	0	0	1	1	1	1	1	0	1	6	0	1	1	1	-1	0	0	1	3	Likely to be deliverable (with Challenges)	Likely to be feasibile (with Challenges)	✗	✗	✓	✓	✗
12	Jetlane (x2) A428 to A1 (S) at Wyboston Rbt	0	0	0	1	0	0	0	0	0	1	2	1	1	0	1	1	0	0	0	4	Likely to be deliverable	Likely to be feasibile	✗	✗	✓	✓	✗
13	Upgrade to existing A1 junctions	0	0	0	1	1	0	1	0	0	1	4	1	1	1	1	1	0	0	0	5	Likely to be deliverable (with Challenges)	Likely to be feasibile (with Challenges)	✗	✓	✓	✓	✗
14	Small scale improvements (Rationalisation of local roads accessing the A428 (eg, High St, Abbotsley Rd), prohibition of right-tur	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	2	Likely to be deliverable	Likely to be feasibile	✗	✗	✓	✓	✗
15	Driver advisory Signs (VMS)	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	Likely to be deliverable	Likely to be feasibile	✗	✗	✓	✓	✗
16	Dualling between Barford Road and Cambridge Road Roundabout	0	0	0	0	1	1	1	1	0	1	5	0	1	-1	1	1	0	0	1	3	Likely to be deliverable (with Challenges)	Likely to be feasibile (with Challenges)	✗	✗	✓	✓	✗
17	Dualling between Cambridge Road and Caxton Gibbet	0	0	0	1	1	1	2	1	0	1	7	0	1	-1	1	1	0	0	1	3	Likely to be deliverable (with Challenges)	Likely to be feasibile (with Challenges)	✗	✗	✓	✓	✗
18	Dualling between St Ives Junction (B1040) and Caxton Gibbet	0	0	0	1	1	1	1	1	0	1	6	0	1	-1	1	1	0	0	1	3	Likely to be deliverable (with Challenges)	Likely to be feasibile (with Challenges)	✗	✗	✓	✓	✗
19	Widening the A1 between Wyboston and Black Cat	0	0	0	0	1	0	1	0	0	1	3	0	0	1	1	0	0	0	1	3	Unlikely to be deliverable	Unlikely to be feasible	✗	✗	✗	✗	✗
20	Tidal Flow lane on A428 providing additional capacity eastbound in the AM and westbound in the PM (zipper mechanism)	0	0	-1	0	2	1	2	0	0	1	5	-1	1	2	2	0	-1	0	1	4	Likely to be deliverable (with Challenges)	Likely to be feasibile (with Challenges)	✗	✗	✓	✓	✗
B - Offline Options																												
1	Full offline dualling	0	2	1	2	2	2	2	2	0	2	15	1	2	2	2	-2	1	0	2	8	Likely to be deliverable (with Challenges)	Likely to be feasibile (with Challenges)	✓	✓	✓	✓	✓
2	Full offline single carriageway	0	2	1	2	2	1	1	2	0	2	13	0	1	1	1	-1	1	0	1	4	Unlikely to be deliverable	Likely to be feasibile (with Challenges)	✓	✗	✗	✓	✗
3	Free-flow link between A1 & A428	0	0	0	1	1	1	1	1	0	1	6	0	1	1	1	-1	0	0	0	2	Likely to be deliverable (with Challenges)	Likely to be feasibile (with Challenges)	✗	✗	✓	✓	✗
4	A1 realignment west of St. Neots	0	0	1	1	1	0	1	0	0	1	5	1	1	1	1	-2	1	0	1	4	Likely to be deliverable (with Challenges)	Likely to be feasibile (with Challenges)	✗	✗	✓	✓	✗
5	A1 realignment east of St. Neots	0	0	1	1	1	0	1	0	0	1	5	1	1	1	1	-2	1	0	1	4	Likely to be deliverable (with Challenges)	Likely to be feasibile (with Challenges)	✗	✗	✓	✓	✗
6	A428 bypass to Cambridge Road Roundabout	0	1	0	1	1	1	1	1	0	1	7	1	1	1	1	-1	1	0	1	5	Likely to be deliverable (with Challenges)	Likely to be feasibile (with Challenges)	✗	✓	✓	✓	✗
C - Combined Package Options																												
1	A428 full offline dualling, grade separation of Black Cat roundabout and grade separation of Caxton Gibbet roundabout	0	2	1	2	2	2	2	2	0	2	15	1	2	2	2	-2	1	0	2	8	Likely to be deliverable (with Challenges)	Likely to be feasibile (with Challenges)	✓	✓	✓	✓	✓
2	A428 full offline dualling, grade separation of Black Cat roundabout and signalisation of Caxton Gibbet roundabout	0	2	1	2	2	2	2	2	0	2	15	1	2	2	2	-2	1	0	2	8	Likely to be deliverable (with Challenges)	Likely to be feasibile (with Challenges)	✓	✓	✓	✓	✓
3	A428 bypass to Cambridge Road roundabout, grade separation at Caxton Gibbet, grade separation at Black Cat, local widening with channelisation between Cambridge Road roundabout and Caxton Gibbet	0	1	1	2	2	1	2	1	0	2	12	1	1	1	2	-1	1	0	1	6	Likely to be deliverable (with Challenges)	Likely to be feasibile (with Challenges)	✓	✓	✓	✓	✓
4	A428 bypass to Cambridge Road roundabout, signalisation at Caxton Gibbet, grade separation at Black Cat, local Widening with channelisation between Cambridge Road Roundabout and Caxton Gibbet	0	1	1	2	2	1	2	1	0	2	12	1	1	1	2	-1	1	0	1	6	Likely to be deliverable (with Challenges)	Likely to be feasibile (with Challenges)	✓	✓	✓	✓	✓
5	A428 bypass to Cambridge Road roundabout, grade separation at Black Cat, grade separation at Caxton Gibbet	0	1	1	2	2	1	2	1	0	2	12	1	1	1	2	-1	1	0	1	6	Likely to be deliverable (with Challenges)	Likely to be feasibile (with Challenges)	✓	✓	✓	✓	✓
6	A428 bypass to Cambridge Road roundabout, grade separation at Black Cat, signalisation at Caxton Gibbet	0	1	1	2	2	1	2	1	0	2	12	1	1	1	2	-1	1	0	1	6	Likely to be deliverable (with Challenges)	Likely to be feasibile (with Challenges)	✓	✓	✓	✓	✓
7	A428 single lane carriageway bypass to Cambridge Road roundabout, online dualling between Cambridge Road roundabout and Caxton Gibbet roundabout, improvements at Black Cat roundabout and Caxton Gibbet roundabout	0	1	1	2	2	1	2	1	0	2	12	1	1	1	2	-1	1	0	1	6	Likely to be deliverable (with Challenges)	Likely to be feasibile (with Challenges)	✓	✓	✓	✓	✓
8	A428 full online dualling with grade separation at Black Cat roundabout and grade separation at Caxton Gibbet roundabout	0	0	-1	2	2	2	2	2	0	2	11	1	2	2	2	-1	-1	0	2	7	Likely to be deliverable (with Challenges)	Likely to be feasibile (with Challenges)	✓	✓	✓	✓	✓
9	A428 full online dualling, grade separation at Black Cat roundabout and signalisation at Caxton Gibbet roundabout	0	0	-1	2	2	2	2	2	0	2	11	1	2	2	2	-1	-1	0	2	7	Likely to be deliverable (with Challenges)	Likely to be feasibile (with Challenges)	✓	✓	✓	✓	✓
10	Local junction widening with channelisation at existing A428 junctions, grade separation at Caxton Gibbet roundabout, grade separation at Black Cat and upgrade to existing A1 junctions	0	0	0	2	2	0	2	0	0	1	7	1	1	2	1	1	1	0	1	8	Likely to be deliverable (with Challenges)	Likely to be feasibile (with Challenges)	✗	✓	✓	✓	✗
11	Local junction widening with channelisation at existing A428 junctions, Signalisation at Caxton Gibbet roundabout, grade separation at Black Cat and upgrade to existing A1 junctions	0	0	0	2	2	0	2	0	0	1	7	1	1	2	1	1	1	0	1	8	Likely to be deliverable (with Challenges)	Likely to be feasibile (with Challenges)	✗	✓	✓	✓	✗
12	Online dualling of the A428 between St Ives Road and Caxton Gibbet and grade separation of Caxton Gibbet roundabout	0	0	0	1	1	1	1	1	0	1	6	1	1	1	1	1	0	0	1	6	Likely to be deliverable	Likely to be feasibile	✗	✓	✓	✓	✗
13	Online dualling of the A428 between St Ives Road and Caxton Gibbet roundabout and signalisation of Caxton Gibbet roundabout	0	0	1	1	1	1	1	1	0	1	7	1	1	1	1	1	1	0	1	7	Likely to be deliverable	Likely to be feasibile	✗	✓	✓	✓	✗
14	Grade separation of Black Cat roundabout and signalisation of Caxton Gibbet	0	0	1	1	1	0	2	1	0	1	7	1	1	1	1	1	1	0	1	7	Likely to be deliverable	Likely to be feasibile	✗	✓	✓	✓	✗
15	Local junction widening with channelisation along A428 and signalisation of Caxton Gibbet	0	0	1	1	1	0	1	1	0	1	6	1	1	1	1	1	1	0	1	7	Likely to be deliverable	Likely to be feasibile	✗	✓	✓	✓	✗
16	A428 dual carriageway bypass to Cambridge Road roundabout with online dualling between Cambridge Road roundabout and Caxton Gibbet roundabout, grade separation at Black Cat roundabout and grade separation at Caxton Gibbet roundabout	0	1	1	2	2	2	2	2	0	2	14	1	2	1	2	-1	1	0	1	7	Likely to be deliverable (with Challenges)	Likely to be feasibile (with Challenges)	✓	✓	✓	✓	✓
17	Dual carriageway bypass from Black Cat roundabout and Caxton Gibbet roundabout, and grade separation of Caxton Gibbet roundabout	0	1	0	-1	1	2	1	1	0	1	6	1	1	1	1	-2	0	0	1	3	Likely to be deliverable (with Challenges)	Likely to be feasibile (with Challenges)	✗	✗	✓	✓	✗

A428 Black Cat roundabout to Caxton Gibbet roundabout

Initial Sift of Options
(Draft Criteria for Approval)

See end of sheet for identified problems and objectives.
See Intervention Matrix (Sheet 2) for Intervention Codes.

Qualitative assessment against identified problems	
2	Large beneficial impact
1	Beneficial impact
0	Neutral / marginal impact
-1	Adverse impact
-2	Large adverse impact

Qualitative assessment against identified objectives	
2	Large beneficial impact
1	Beneficial impact
0	Neutral / marginal impact
-1	Adverse impact
-2	Large adverse impact

Deliverability (e.g. political, planning, timescale or third party issues)
Likely to be deliverable
Likely to be deliverable (with Challenges)
Unlikely to be deliverable

Feasibility (e.g. physical constraint, land availability and design standards)
Likely to be feasibile
Likely to be feasibile (with Challenges)
Unlikely to be feasible

Initial Sifting Criteria
Each option must meet the following sifting criteria to be considered further within EAST:
1: Overall moderate impact against identified problems (Appraisal score >4, see East Conversion below)
2: Overall moderate fit with route objectives (Appraisal score >3, see East conversion below)
3: Likely to be deliverable
4: Likely be feasible in theory

Reference (Route Section-Intervention)	Option Description	Problems (EAST Scale of Impact)											Objectives (EAST Fit with Other Objectives)									Deliverability	Feasibility	Initial Sifting Criteria Prior to EAST				Take to EAST
		1	2	3	4	5	6	7	8	9	10	Total	1	2	3	4	5	6	7	8	Total			1	2	3	4	
D - Public Transport Options																												
1	Reinstate East - West Rail Link	2	1	0	0	1	0	1	0	0	2	7	1	1	1	2	1	0	0	0	6	Likely to be deliverable (with Challenges)	Likely to be feasibile (with Challenges)	✗	✓	✓	✓	✗
2	Park & Ride @ St. Neots	1	0	0	0	0	0	0	0	0	1	2	0	0	0	1	1	0	0	0	2	Likely to be deliverable (with Challenges)	Likely to be feasibile	✗	✗	✓	✓	✗
3	Tram services	2	0	0	1	1	0	0	0	0	1	5	0	1	0	1	1	0	0	0	3	Likely to be deliverable (with Challenges)	Likely to be feasibile (with Challenges)	✗	✗	✓	✓	✗
4	Bus service improvements	2	0	0	1	1	0	0	0	0	1	5	1	1	0	1	1	0	0	0	4	Likely to be deliverable	Likely to be feasibile	✗	✗	✓	✓	✗
5	Guided bus way extension	2	1	0	0	1	0	1	0	0	2	7	1	1	1	2	1	0	0	0	6	Likely to be deliverable	Likely to be feasibile	✗	✓	✓	✓	✗
E - NMU Options																												
1	Segregated Cycle lanes	0	0	2	0	0	0	0	0	0	0	2	1	1	0	0	0	2	0	0	4	Likely to be deliverable (with Challenges)	Likely to be feasibile (with Challenges)	✗	✗	✓	✓	✗
2	Improved pedestrian walkways	0	0	2	0	0	0	0	0	0	0	2	1	1	0	0	1	2	0	1	6	Likely to be deliverable (with Challenges)	Likely to be feasibile (with Challenges)	✗	✓	✓	✓	✗

Identified Problems

1 There are inadequate public transport options along the corridor; which has only limited bus services and no parallel rail service provision
2 There is a lack of viable alternative east-west routes between Cambridge and other economic centres such as Milton Keynes, Northampton and Bedford
3 There is poor non-motorised user provision along the corridor
4 A number of junctions along the corridor operate close to, or at capacity;
5 Peak hour speeds along the corridor are significantly lower than the rest of the day
6 Speeds on the single carriageway sections of the corridor are significantly lower than those that are dualled
7 There is a high degree of journey time variability along the corridor, making it difficult for users to plan their journey with confidence
8 There is low resilience against accidents and incidents on the single carriageway sections of the corridor
9 There is a lack of driver information along the corridor
10 The above problems also constrain economic growth along the corridor

Route Objectives

1 Making the network safer
2 User satisfaction
3 Supporting the smooth flow of traffic
4 Encouraging economic growth
5 Delivering better environmental outcomes
6 Helping cyclists, walkers and other vulnerable users of the Network
7 Achieving real efficiency
8 Keeping the network in good condition

East Conversion

Problems (Scale of Impact)

Appraisal Score	East Rating
≤0	Very small impact
1	
2	Minor Impact
3	
4	
5	Moderate Impact
6	
7	
8	
9	
10	
11	
12	Significant impact
13	
14	
15	
16	
17	
18	Fully addresses identified problems
19	
20	
21	
22	

31

Objectives (Fit with Other Objectives)

Appraisal Score	Rating
≤0	Very small impact
1	Minor Impact
2	
3	
4	
5	Moderate Impact
6	
7	
8	
9	Significant Impact
10	
11	
12	
13	Fully Addresses Objectives
14	
15	
16	

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Appendix I. Early Assessment and Sifting Tool (EAST) Outputs

Early Assessment and Sifting Tool (EAST)

Change text size

This tool aims to help you to record and compare data on your options. Below is a summary of all saved options.
To add a new option: click on the 'Add New Option' button above and complete the assessment sheet.
To view a saved option: click on its name in the 'Name/No.' column below.
To delete a saved option: click on the 'Delete' hyperlink to the left of its name below.
To read further guidance on how to use this tool, please double-click on the 'Tool User Guide' icon above.

User Guide ← To read the user guide to the tool, please double-click on this icon

16 option(s) have been saved in total. 16 is/are currently

Document

Overall / Strategic

Unique Ref. No.	Delete option?	Name/No.	Date	Description	Identified problems and objectives of the option	Scale of impact	Scale of impact - Comments	Fit with wider transport and government objectives	Wider transport and government objectives - Comments	Fit with other objectives	Fit with other objectives - Comments	Key uncertainties	Degree of consensus over outcomes?	Degree of consensus over outcomes? - Comments
1	Delete	A1	11/09/2015	A428 full widening	See initial sifting spreadsheet	3	The scheme is likely to have a moderate impact on the problems currently impacting the corridor	4	The scheme is likely to support most government policy, in particular through supporting growth, tackling congestion and improving journey time reliability	3	The scheme is likely to have a moderate fit with the defined RIS objectives.		1. Little	Little to no consultation taken place at this stage.
2	Delete	B1	11/09/2015	A428 offline dualling between Black Cat roundabout and Caxton Gibbet roundabout	See initial sifting spreadsheet	4	The scheme is likely to have a significant impact on the problems currently impacting the corridor	4	The scheme is likely to support most government policy, in particular through supporting growth, tackling congestion and improving journey time reliability.	3	The scheme is likely to have a moderate fit with the defined RIS objectives.		1. Little	Little to no consultation taken place at this stage.
3	Delete	C1	11/09/2015	A428 full offline dualling with grade separation of Black Cat roundabout and grade separation of Caxton Gibbet roundabout	See initial sifting spreadsheet	4	The scheme is likely to have a significant impact on the problems currently impacting the corridor	4	The scheme is likely to support most government policy, in particular through supporting growth, tackling congestion and improving journey time reliability	3	The scheme is likely to have a moderate fit with the defined RIS objectives.		1. Little	Little to no consultation taken place at this stage.
4	Delete	C2	11/09/2015	A428 full offline dualling with grade separation of Black Cat roundabout and signalisation of Caxton Gibbet roundabout	See initial sifting spreadsheet	4	The scheme is likely to have a significant impact on the problems currently impacting the corridor	4	The scheme is likely to support most government policy, in particular through supporting growth, tackling congestion and improving journey time reliability	3	The scheme is likely to have a moderate fit with the defined RIS objectives.		1. Little	Little to no consultation taken place at this stage.
5	Delete	C3	11/09/2015	A428 bypass to Cambridge Road roundabout with grade separation at Caxton Gibbet, grade separation at Black Cat and local widening with channelisation between Cambridge Road roundabout and Caxton Gibbet roundabout	See initial sifting spreadsheet	4	The scheme is likely to have a significant impact on the problems currently impacting the corridor	4	The scheme is likely to support most government policy, in particular through supporting growth, tackling congestion and improving journey time reliability	3	The scheme is likely to have a moderate fit with the defined RIS objectives.		1. Little	Little to no consultation taken place at this stage.
6	Delete	C4	11/09/2015	A428 bypass to Cambridge Road roundabout with signalisation at Caxton Gibbet roundabout, grade separation at Black Cat roundabout, local widening with channelisation between Cambridge Road roundabout and Caxton Gibbet roundabout	See sifting spreadsheet	4	The scheme is likely to have a significant impact on the problems currently impacting the corridor	4	The scheme is likely to support most government policy, in particular through supporting growth, tackling congestion and improving journey time reliability	3	The scheme is likely to have a moderate fit with the defined RIS objectives.		1. Little	Little to no consultation taken place at this stage.
7	Delete	C5	11/09/2015	A428 bypass to Cambridge Road roundabout with grade separation at Black Cat, and grade separation at Caxton Gibbet roundabout	See sifting spreadsheet	4	The scheme is likely to have a significant impact on the problems currently impacting the corridor	4	The scheme is likely to support most government policy, in particular through supporting growth, tackling congestion and improving journey time reliability	3	The scheme is likely to have a moderate fit with the defined RIS objectives.		1. Little	Little to no consultation taken place at this stage.
8	Delete	C6	11/11/2015	A428 bypass to Cambridge Road R'bout with grade separation at Black Cat roundabout, and signalisation at Caxton Gibbet roundabout	See sifting spreadsheet	3	The scheme is likely to have a moderate impact on the problems currently impacting the corridor	4	The scheme is likely to support most government policy, in particular through supporting growth, tackling congestion and improving journey time reliability	3	The scheme is likely to have a moderate fit with the defined RIS objectives.		1. Little	Little to no consultation taken place at this stage.
9	Delete	C7	11/11/2015	A428 single lane carriageway bypass to Cambridge Road roundabout with online dualling between Cambridge Road roundabout and Caxton Gibbet roundabout, grade separation at Black Cat roundabout and grade separation at Caxton Gibbet roundabout	See sifting spreadsheet	4	The scheme is likely to have a significant impact on the problems currently impacting the corridor	4	The scheme is likely to support most government policy, in particular through supporting growth, tackling congestion and improving journey time reliability	3	The scheme is likely to have a moderate fit with the defined RIS objectives.		1. Little	Little to no consultation taken place at this stage.
10	Delete	C8	11/11/2015	A428 full online dualling with grade separation at Black Cat roundabout and Grade separation at Caxton Gibbet roundabout	See sifting spreadsheet	4	The scheme is likely to have a significant impact on the problems currently impacting the corridor	4	The scheme is likely to support most government policy, in particular through supporting growth, tackling congestion and improving journey time reliability	3	The scheme is likely to have a moderate fit with the defined RIS objectives.		1. Little	Little to no consultation taken place at this stage.
11	Delete	C9	11/11/2015	A428 full online dualling with grade separation at Black Cat roundabout and signalisation at Caxton Gibbet roundabout	See sifting spreadsheet	4	The scheme is likely to have a significant impact on the problems currently impacting the corridor	4	The scheme is likely to support most government policy, in particular through supporting growth, tackling congestion and improving journey time reliability	3	The scheme is likely to have a moderate fit with the defined RIS objectives.		1. Little	Little to no consultation taken place at this stage.
12	Delete	C10	11/11/2015	Local junction widening with channelisation at existing A428 junctions, grade separation at Caxton Gibbet roundabout, grade separation at Black Cat roundabout and upgrade to existing A1 junctions	See sifting spreadsheet	3	The scheme is likely to have a moderate impact on the problems currently impacting the corridor	3	The scheme is likely to support most government policy, in particular through supporting growth, tackling congestion and improving journey time reliability. However, it is unlikely to contribute as much as other schemes.	3	The scheme is likely to have a moderate fit with the defined RIS objectives.		1. Little	Little to no consultation taken place at this stage.
13	Delete	C11	11/11/2015	Local junction widening with channelisation at existing A428 junctions, signalisation at Caxton Gibbet roundabout, grade separation at Black Cat roundabout and upgrade to existing A1 junctions	See sifting spreadsheet	3	The scheme is likely to have a moderate impact on the problems currently impacting the corridor	3	The scheme is likely to support most government policy, in particular through supporting growth, tackling congestion and improving journey time reliability. However, it is unlikely to contribute as much as other schemes.	3	The scheme is likely to have a moderate fit with the defined RIS objectives.		1. Little	Little to no consultation taken place at this stage.
14	Delete	C13	11/11/2015	Online dualling of the A428 between St Ives Road and Caxton Gibbet roundabout and signalisation of Caxton Gibbet roundabout	See sifting spreadsheet	3	The scheme is likely to have a moderate impact on the problems currently impacting the corridor	3	The scheme is likely to support most government policy, in particular through supporting growth, tackling congestion and improving journey time reliability. However, it is unlikely to contribute as much as other schemes.	3	The scheme is likely to have a moderate fit with the defined RIS objectives.		1. Little	Little to no consultation taken place at this stage.
15	Delete	C14	11/11/2015	Grade separation of Black Cat roundabout and signalisation of Caxton Gibbet roundabout	See sifting spreadsheet	3	The scheme is likely to have a moderate impact on the problems currently impacting the corridor	3	The scheme is likely to support most government policy, in particular through supporting growth, tackling congestion and improving journey time reliability. However, it is unlikely to contribute as much as other schemes.	3	The scheme is likely to have a moderate fit with the defined RIS objectives.		1. Little	Little to no consultation taken place at this stage.
16	Delete	C16	14/12/2015	A428 dual carriageway bypass to Cambridge Road roundabout with online dualling between Cambridge Road roundabout and Caxton Gibbet roundabout, grade separation at Black Cat roundabout and grade separation at Caxton Gibbet roundabout	See sifting spreadsheet	4	The scheme is likely to have a significant impact on the problems currently impacting the corridor	4	The scheme is likely to support most government policy, in particular through supporting growth, tackling congestion and improving journey time reliability	3	The scheme is likely to have a moderate fit with the defined RIS objectives.		1. Little	Little to no consultation taken place at this stage.

Economic

Unique Ref. No.	Name/No.	Economic Growth	Economic growth - Comments	Carbon emissions	Carbon emissions - Comments	Socio-distributional impacts and the regions	Socio-distributional impacts and the regions - Comments	Local environment	Local environment - Comments	Well being	Well being - Comments	Expected VfM Category	Expected VfM Category - Comments
1	A1	4. Amber/green	The scheme is likely to significantly reduce journey times and improve journey time reliability, which will have a positive impact on economic growth	3. Amber	The Scheme is not likely to result in any change to carbon emissions. It is not possible to quantify greenhouse gases at this stage.	4. Amber/green	The scheme is likely to have a positive impact on journey quality and minimal or neutral impact on other social sub objectives.	3. Amber	The scheme would likely have slight benificial impacts on air quality and noise, and adverse impacts on the historic environment and biodiversity.	3. Amber	Scheme is likely to improve access to goods and services and reduce accidents, therefore having a positive impact	3. Medium 1.5-2	
2	B1	4. Amber/green	The scheme is likely to significantly reduce journey times and improve journey time reliability, which will have a positive impact on economic growth	3. Amber	Offline options will involve major construction; however, on the whole, the Scheme is unlikely to affect overall carbon emissions.	4. Amber/green	The scheme is likely to have a positive impact on journey quality and minimal or neutral impact on other social sub objectives.	2. Red/amber	The Scheme will likely have a positive impact on air and noise. However, this will likely be outweighed by adverse impacts to biodiversity, heritage, and the water environment.	4. Amber/green	Scheme is likely to improve access to goods and services and reduce accidents, therefore having a positive impact	3. Medium 1.5-2	
3	C1	5. Green	The scheme is likely to significantly reduce journey times and improve journey time reliability, which will have a positive impact on economic growth, it will also reduce queuing at junctions and allow for a more free flowing network.	3. Amber	Offline options will involve major construction; however, on the whole, the Scheme is unlikely to affect overall carbon emissions.	4. Amber/green	The scheme is likely to have a positive impact on journey quality and minimal or neutral impact on other social sub objectives.	2. Red/amber	The Scheme will likely have a positive impact on air and noise. However, this will likely be outweighed by adverse impacts to biodiversity, landscape, heritage, and the water environment	4. Amber/green	Scheme is likely to improve access to goods and services and reduce accidents, therefore having a positive impact	2. High 2-4	
4	C2	4. Amber/green	The scheme is likely to significantly reduce journey times and improve journey time reliability, which will have a positive impact on economic growth	3. Amber	Offline options will involve major construction; however, on the whole, the Scheme is unlikely to affect overall carbon emissions.	4. Amber/green	The scheme is likely to have a positive impact on journey quality and minimal or neutral impact on other social sub objectives.	2. Red/amber	The Scheme will likely have a positive impact on air and noise. However, this will likely be outweighed by adverse impacts to biodiversity, landscape, heritage, and the water environment	4. Amber/green	Scheme is likely to improve access to goods and services and reduce accidents, therefore having a positive impact	2. High 2-4	
5	C3	4. Amber/green	The scheme is likely to significantly reduce journey times and improve journey time reliability, which will have a positive impact on economic growth	3. Amber	Offline options will involve major construction; however, on the whole, the Scheme is unlikely to affect overall carbon emissions.	4. Amber/green	The scheme is likely to have a positive impact on journey quality and minimal or neutral impact on other social sub objectives.	3. Amber	The Scheme will likely have a beneficial impact on noise and air, however this will likely be balanced by the adverse impacts to the natural/heritage environment.	4. Amber/green	Scheme is likely to improve access to goods and services and reduce accidents at the junction, therefore having a positive impact	2. High 2-4	
6	C4	3. Amber	The scheme is likely to reduce journey times and improve journey time reliability, which will have a positive impact on economic growth. However, there is still likely to be queuing at a number of junctions on the route.	3. Amber	Offline options will involve major construction; however, on the whole, the Scheme is unlikely to affect overall carbon emissions.	4. Amber/green	The scheme is likely to have a positive impact on journey quality and minimal or neutral impact on other social sub objectives.	3. Amber	The Scheme will likely have a beneficial impact on noise and air, however this will likely be balanced by the adverse impacts to the natural/heritage environment.	4. Amber/green	Scheme is likely to improve access to goods and services and reduce accidents, therefore having a positive impact	2. High 2-4	
7	C5	4. Amber/green	The scheme is likely to significantly reduce journey times and improve journey time reliability, which will have a positive impact on economic growth	3. Amber	Offline options will involve major construction; however, on the whole, the Scheme is unlikely to affect overall carbon emissions.	4. Amber/green	The scheme is likely to have a positive impact on journey quality and minimal or neutral impact on other social sub objectives.	3. Amber	The Scheme will likely have a beneficial impact on noise and air, however this will likely be balanced by the adverse impacts to the natural/heritage environment.	4. Amber/green	Scheme is likely to improve access to goods and services and reduce accidents, therefore having a positive impact	2. High 2-4	
8	C6	3. Amber	The scheme is likely to reduce journey times and improve journey time reliability, which will have a positive impact on economic growth. However, there is still likely to be queuing at a number of junctions on the route	3. Amber	Offline options will involve major construction; however, on the whole, the Scheme is unlikely to affect overall carbon emissions.	4. Amber/green	The scheme is likely to have a positive impact on journey quality and minimal or neutral impact on other social sub objectives.	3. Amber	The Scheme will likely have a beneficial impact on noise and air, however this will likely be balanced by the adverse impacts to the natural/heritage environment.	4. Amber/green	Scheme is likely to improve access to goods and services and reduce accidents, therefore having a positive impact	2. High 2-4	
9	C7	4. Amber/green	The scheme is likely to significantly reduce journey times and improve journey time reliability, which will have a positive impact on economic growth	3. Amber	Offline options will involve major construction; however, on the whole, the Scheme is unlikely to affect overall carbon emissions.	4. Amber/green	The scheme is likely to have a positive impact on journey quality and minimal or neutral impact on other social sub objectives.	3. Amber	The Scheme will likely have a beneficial impact on noise and air, however this will likely be balanced by the adverse impacts to the natural/heritage environment.	4. Amber/green	Scheme is likely to improve access to goods and services and reduce accidents, therefore having a positive impact	2. High 2-4	
10	C8	4. Amber/green	The scheme is likely to significantly reduce journey times and improve journey time reliability, which will have a positive impact on economic growth	3. Amber	The Scheme is not likely to result in any change to carbon emissions. It is not possible to quantify greenhouse gases at this stage.	4. Amber/green	The scheme is likely to have a positive impact on journey quality and minimal or neutral impact on other social sub objectives.	3. Amber	The scheme would likely have slight benificial impacts n air quality and noise, and slight adverse impacts on the historic environment and biodiversity.	4. Amber/green	Scheme is likely to improve access to goods and services and reduce accidents, therefore having a positive impact	3. Medium 1.5-2	
11	C9	3. Amber	The scheme is likely to reduce journey times and improve journey time reliability, which will have a positive impact on economic growth. However, there is still likely to be queuing at a number of junctions on the route.	3. Amber	The Scheme is not likely to result in any change to carbon emissions. It is not possible to quantify greenhouse gases at this stage.	4. Amber/green	The scheme is likely to have a positive impact on journey quality and minimal or neutral impact on other social sub objectives.	3. Amber	The scheme would likely have slight benificial impacts n air quality and noise, and slight adverse impacts on the historic environment and biodiversity.	4. Amber/green	Scheme is likely to improve access to goods and services and reduce accidents, therefore having a positive impact	3. Medium 1.5-2	
12	C10	4. Amber/green	The scheme is likely to significantly reduce journey times and improve journey time reliability, which will have a positive impact on economic growth	3. Amber	The Scheme is not likely to result in any change to carbon emissions. It is not possible to quantify greenhouse gases at this stage.	4. Amber/green	The scheme is likely to have a positive impact on journey quality and minimal or neutral impact on other social sub objectives.	3. Amber	Junction improvements would likely result in no significant impacts to the local environment	4. Amber/green	Scheme is likely to improve access to goods and services and reduce accidents, therefore having a positive impact	3. Medium 1.5-2	
13	C11	3. Amber	The scheme is likely to reduce journey times and improve journey time reliability, which will have a positive impact on economic growth. However, there is still likely to be queuing at a number of junctions on the route.	3. Amber	The Scheme is not likely to result in any change to carbon emissions. It is not possible to quantify greenhouse gases at this stage.	4. Amber/green	The scheme is likely to have a positive impact on journey quality and minimal or neutral impact on other social sub objectives.	3. Amber	Junction improvements would likely result in no significant impacts to the local environment	4. Amber/green	Scheme is likely to improve access to goods and services and reduce accidents, therefore having a positive impact	3. Medium 1.5-2	
14	C13	2. Red/amber	The scheme is likely to provide some savings in journey time and to improve reliability of travel through Caxton Gibbet. However, it is unlikely to unlock significant growth along the scheme.	3. Amber	The Scheme is not likely to result in any change to carbon emissions. It is not possible to quantify greenhouse gases at this stage.	3. Amber	The scheme is likely to have a small positive impact on journey quality and minimal or neutral impact on other social sub objectives.	3. Amber	The Scheme is unlikely to have any significant impact on the local environment.	3. Amber	The scheme is likely to improve access to goods and services and reduce accidents at Caxton Gibbet roundabout therefore having a positive impact	3. Medium 1.5-2	
15	C14	3. Amber	The scheme is likely to significantly improve the conditions for travel through Black Cat, however it is likely there will still be queuing at Caxton Gibbet.	3. Amber	The Scheme is not likely to result in any change to carbon emissions. It is not possible to quantify greenhouse gases at this stage.	3. Amber	The scheme is likely to have a small positive impact on journey quality and minimal or neutral impact on other social sub objectives.	3. Amber	Junction improvements would likely result in no significant impacts to the local environment	4. Amber/green	Scheme is likely to improve access to goods and services and reduce accidents, therefore having a positive impact	3. Medium 1.5-2	
16	C16	5. Green	The scheme is likely to significantly reduce journey times and improve journey time reliability, which will have a positive impact on economic growth	3. Amber	Offline options will involve major construction; however, on the whole, the Scheme is unlikely to affect overall carbon emissions.	4. Amber/green	The scheme is likely to have a positive impact on journey quality and minimal or neutral impact on other social sub objectives.	3. Amber	The Scheme will likely have a beneficial impact on noise and air, however this will likely be balanced by the adverse impacts to the natural/heritage environment.	4. Amber/green	Scheme is likely to improve access to goods and services and reduce accidents, therefore having a positive impact	3. Medium 1.5-2	

Managerial

Unique Ref. No.	Name/No.	Implementation timetable	Implementation timetable - Comments	Public acceptability	Public acceptability - Comments	Practical feasibility	Practical feasibility - Comments	What is the quality of the supporting evidence?	What is the quality of the supporting evidence? - Comments	Key risks
1	A1	6. 5-10 years	Construction phasing and traffic management could be more onerous considering the online nature of the option	3	The option is likely to receive mixed support. The A428 is recognised as a problem and any improvement will likely receive some support, however, there will also be opposition from environmental groups.	3	Traffic Management phasing during construction resulting in a lengthy construction period	3	Reasonable level of supporting evidence, good underlying data and basic level of supporting traffic modelling.	Funding or policy change
2	B1	6. 5-10 years	DCO required for design phase, with offline route assisting with the construction phase	4	The option is likely to receive mixed support. The A428 is recognised as a problem and any improvement will likely receive some support, however, there will also be opposition from environmental groups.	5. High	No significant issues. Floodplain and East Coast Main Line to cross, but there is time in the design programme to mitigate issues.	3	Reasonable level of supporting evidence, good underlying data and basic level of supporting traffic modelling.	Funding or policy change
3	C1	6. 5-10 years	DCO required for design phase, with offline route assisting with the construction phase	4	The option is likely to receive support from the public. The A428 is recognised as a problem and a large improvement such as this that significantly addresses the issues on the route is likely to be well supported, however, there will also be opposition from environmental groups.	5. High	No significant issues. Floodplain and East Coast Main Line to cross, but there is time in the design programme to mitigate issues.	3	Reasonable level of supporting evidence, good underlying data and basic level of supporting traffic modelling.	Funding or policy change
4	C2	6. 5-10 years	DCO required for design phase, with offline route assisting with the construction phase	4	The option is likely to receive support from the public. The A428 is recognised as a problem and a large improvement such as this that significantly addresses the issues on the route is likely to be well supported, however, there will also be opposition from environmental groups.	5. High	No significant issues. Floodplain and East Coast Main Line to cross, but there is time in the design programme to mitigate issues.	3	Reasonable level of supporting evidence, good underlying data and basic level of supporting traffic modelling.	Funding or policy change
5	C3	6. 5-10 years	DCO required for design phase, with offline route assisting with the construction phase	2	The option is likely to receive mixed support as it is not the full improvement. The A428 is recognised as a problem and any improvement will likely receive some support, however, there will also be opposition from environmental groups.	4	No significant issues. Floodplain and East Coast Main Line to cross, but there is time in the design programme to mitigate issues. Some on-line improvements requiring Traffic Management phasing	3	Reasonable level of supporting evidence, good underlying data and basic level of supporting traffic modelling.	Funding or policy change
6	C4	6. 5-10 years	DCO required for design phase, with offline route assisting with the construction phase	2	the full improvement. The A428 is recognised as a problem and any improvement will likely receive some support, however, there will also be opposition from environmental groups.	4	No significant issues. Floodplain and East Coast Main Line to cross, but there is time in the design programme to mitigate issues. Some on-line improvements requiring Traffic Management phasing	3	Reasonable level of supporting evidence, good underlying data and basic level of supporting traffic modelling.	Funding or policy change
7	C5	6. 5-10 years	DCO required for design phase, with offline route assisting with the construction phase	2	The option is likely to receive mixed support. The A428 is recognised as a problem and any improvement will likely receive some support, however, there will also be opposition from environmental groups.	5. High	No significant issues. Floodplain and East Coast Main Line to cross, but there is time in the design programme to mitigate issues. Some on-line improvements requiring Traffic Management phasing	3	Reasonable level of supporting evidence, good underlying data and basic level of supporting traffic modelling.	Funding or policy change
8	C6	6. 5-10 years	DCO required for design phase, with offline route assisting with the construction phase	2	The option is likely to receive mixed support. The A428 is recognised as a problem and any improvement will likely receive some support, however, there will also be opposition from environmental groups.	5. High	No significant issues. Floodplain and East Coast Main Line to cross, but there is time in the design programme to mitigate issues. Some on-line improvements requiring Traffic Management phasing	3	Reasonable level of supporting evidence, good underlying data and basic level of supporting traffic modelling.	Funding or policy change
9	C7	6. 5-10 years	DCO required for design phase, with offline route assisting with the construction phase	3	The option is likely to receive mixed support. The A428 is recognised as a problem and any improvement will likely receive some support, however, there will also be opposition from environmental groups.	5. High	No significant issues. Floodplain and East Coast Main Line to cross, but there is time in the design programme to mitigate issues. Some on-line improvements requiring Traffic Management phasing	3	Reasonable level of supporting evidence, good underlying data and basic level of supporting traffic modelling.	Funding or policy change
10	C8	6. 5-10 years	Construction phasing and traffic management could be more onerous considering the online nature of the option	3	The option is likely to receive mixed support. The A428 is recognised as a problem and any improvement will likely receive some support, however, there will also be opposition from environmental groups.	3	Traffic Management phasing during construction resulting in a lengthy construction period	3	Reasonable level of supporting evidence, good underlying data and basic level of supporting traffic modelling.	Funding or policy change
11	C9	6. 5-10 years	Construction phasing and traffic management could be more onerous considering the online nature of the option	3	The option is likely to receive mixed support. The A428 is recognised as a problem and any improvement will likely receive some support, however, there will also be opposition from environmental groups.	3	Traffic Management phasing during construction resulting in a lengthy construction period	3	Reasonable level of supporting evidence, good underlying data and basic level of supporting traffic modelling.	Funding or policy change
12	C10	6. 5-10 years	CPO, SRO, Planning required	1. Low	The option is likely to receive mixed support as it will not be perceived to address the problems. The A428 is recognised as a problem and any improvement will likely receive some support, however, there will also be opposition from environmental groups.	3	Significant works to existing junctions	3	Reasonable level of supporting evidence, good underlying data and basic level of supporting traffic modelling.	Funding or policy change
13	C11	6. 5-10 years	CPO, SRO, Planning required	1. Low	The option is likely to not receive support as objective not met. The A428 is recognised as a problem and any improvement will likely receive some support, however, there will also be opposition from environmental groups.	5. High	Significant works to existing junctions	3	Reasonable level of supporting evidence, good underlying data and basic level of supporting traffic modelling.	Funding or policy change
14	C13	6. 5-10 years	CPO for the dualling	1. Low	The option is not likely to receive support as the overall objectives are not addressed. The A428 is recognised as a problem and any improvement will likely receive some support, however, there will also be opposition from environmental groups.	5. High	Widening the exsitng route	3	Reasonable level of supporting evidence, good underlying data and basic level of supporting traffic modelling.	Funding or policy change
15	C14	6. 5-10 years	DCO, SRO and Planning	1. Low	The option is likely to receive mixed support. The A428 is recognised as a problem and any improvement will likely receive some support, however, there will also be opposition from environmental groups.	5. High	Traffic Management required	3	Reasonable level of supporting evidence, good underlying data and basic level of supporting traffic modelling.	Funding or policy change
16	C16	6. 5-10 years	DCO required for design phase, with offline route assisting with the construction phase	3	The option is likely to receive mixed support. The A428 is recognised as a problem and any improvement will likely receive some support, however, there will also be opposition from environmental groups.	5. High	No significant issues. Floodplain and East Coast Main Line to cross, but there is time in the design programme to mitigate issues. Some on-line improvements requiring Traffic Management phasing	3		Funding or policy change

Financial

Unique Ref. No.	Name/No.	Affordability	Affordability - Comments	Capital Cost (£m)?	Capital Cost (£m)? - Comments	Revenue Costs (£m)?	Revenue Costs (£m)? - Details	Cost Profile	Overall cost risk	Other costs
1	A1	3	£1bn of funding has been allocated to improvements along the A1 and A428 between Black Cat roundabout and Caxton Gibbet, however, this option is likely to cost less.	09. 500-1000	Guesstimate without Highways England Commercial Services input. Likely to be cheaper than offline solution, but greater than £500m	01. None		N/A	3	Construction costs with Traffic Management and Statutory Undertakers equipment
2	B1	2	£1bn of funding has been allocated to improvements along the A1 and A428 between Black Cat roundabout and Caxton Gibbet, however, this option is likely to cost less.	09. 500-1000	The Highways England Commercial Sevices Team has estimated slightly over £1bn, but estimate review shows over estimation in some areas and therefor deliverable within £1bn affordablity threshold	01. None		N/A	5. Low risk	Deemed affordable within the £1bn
3	C1	2	£1bn of funding has been allocated to improvements along the A1 and A428 between Black Cat roundabout and Caxton Gibbet, however, this option is likely to cost less.	09. 500-1000	The Highways England Commercial Sevices Team has estimated slightly over £1bn, but estimate review shows over estimation in some areas and therefor deliverable within £1bn affordablity threshold	01. None		N/A	5. Low risk	Deemed affordable within the £1bn
4	C2	2	£1bn of funding has been allocated to improvements along the A1 and A428 between Black Cat roundabout and Caxton Gibbet, however, this option is likely to cost less.	09. 500-1000	The Highways England Commercial Sevices Team has estimated slightly over £1bn, but estimate review shows over estimation in some areas and therefor deliverable within £1bn affordablity threshold	01. None		N/A	5. Low risk	Deemed affordable within the £1bn
5	C3	2	£1bn of funding has been allocated to improvements along the A1 and A428 between Black Cat roundabout and Caxton Gibbet, however, this option is likely to cost less.	09. 500-1000	The Highways England Commercial Sevices Team has estimated slightly over £1bn, but estimate review shows over estimation in some areas and therefor deliverable within £1bn affordablity threshold	01. None		N/A	5. Low risk	Deemed affordable within £1bn
6	C4	2	£1bn of funding has been allocated to improvements along the A1 and A428 between Black Cat roundabout and Caxton Gibbet, however, this option is likely to cost less.	09. 500-1000	The Highways England Commercial Sevices Team has estimated slightly over £1bn, but estimate review shows over estimation in some areas and therefor deliverable within £1bn affordablity threshold	01. None		N/A	5. Low risk	Deemed affordable within £1bn
7	C5	2	£1bn of funding has been allocated to improvements along the A1 and A428 between Black Cat roundabout and Caxton Gibbet, however, this option is likely to cost less.	08. 250-500	Guesstimate, based on the Highways England Commercial Services estimate for Option C1	01. None		N/A	5. Low risk	Deemed affordable within £1bn
8	C6	2	£1bn of funding has been allocated to improvements along the A1 and A428 between Black Cat roundabout and Caxton Gibbet, however, this option is likely to cost less.	08. 250-500	Guesstimate, based on the Highways England Commercial Services estimate for Option C1	01. None		N/A	5. Low risk	Deemed affordable within £1bn
9	C7	2	£1bn of funding has been allocated to improvements along the A1 and A428 between Black Cat roundabout and Caxton Gibbet, however, this option is likely to cost less.	08. 250-500	Guesstimate, based on the Highways England Commercial Services estimate for Option C1	01. None		N/A	3	Online section TM & STATS
10	C8	3	£1bn of funding has been allocated to improvements along the A1 and A428 between Black Cat roundabout and Caxton Gibbet, however, this option is likely to cost less.	09. 500-1000	Guesstimate without Highways England Commercial Services input. Likely to be cheaper than offline solution, but greater than £500m	01. None		N/A	3	Construction costs with Traffic Management and Statutory Undertakers equipment
11	C9	3	£1bn of funding has been allocated to improvements along the A1 and A428 between Black Cat roundabout and Caxton Gibbet, however, this option is likely to cost less.	09. 500-1000	Guesstimate without Highways England Commercial Services input. Likely to be cheaper than offline solution, but greater than £500m	01. None		N/A	3	Construction costs with Traffic Management and Statutory Undertakers equipment
12	C10	5. Affordable	£1bn of funding has been allocated to improvements along the A1 and A428 between Black Cat roundabout and Caxton Gibbet, however, this option is likely to cost less.	07. 100-250	Guesstimate based on the Highways England Commerical Services Team estimate for the Black Cat grade seperated junction at £50m	01. None		N/A	3	Online improvements with construction phasing
13	C11	5. Affordable	£1bn of funding has been allocated to improvements along the A1 and A428 between Black Cat roundabout and Caxton Gibbet, however, this option is likely to cost less.	07. 100-250	Guesstimate based on the Highways England Commerical Services Team estimate for the Black Cat grade seperated junction at £50m	01. None		N/A	3	Online improvements with construction phasing
14	C13	5. Affordable	£1bn of funding has been allocated to improvements along the A1 and A428 between Black Cat roundabout and Caxton Gibbet, however, this option is likely to cost less.	06. 50-100	Guesstimate based on the Highways England Commercial Services Estimate	01. None		N/A	3	CPO and Statutory Undertakers diversion costs
15	C14	5. Affordable	£1bn of funding has been allocated to improvements along the A1 and A428 between Black Cat roundabout and Caxton Gibbet, however, this option is likely to cost less.	06. 50-100	Guesstimate based on the £50m estimate produced by the Highways England Commercial Services Team for the Black Cat roundabout grade separated junction	01. None		N/A	3	CPO and Statutory Undertakers diversion costs
16	C16	2	£1bn of funding has been allocated to improvements along the A1 and A428 between Black Cat roundabout and Caxton Gibbet, however, this option is likely to cost between £500m and £1bn	09. 500-1000		01. None		N/A	3	Online section TM & STATS

Commercial

Unique Ref. No.	Name/No.	Flexibility of option	Flexibility of option - Comments	Where is funding coming from?	Any income generated? (Y/N)	If yes, how much income generated (£m)?
1	A1	3	As an online dualling option this is relatively flexible with the ability to only widen a certain distance or certain sections should the appetite for funding change and the scheme need to be scaled up or down	Government RIS	No	
2	B1	2	As an offline option there is limited scope to alter the scheme once construction has begun.	Government RIS	No	
3	C1	3	As a combination of interventions there is the opportunity to remove elements should funding change, allowing for relatively significant changes in scale of the overall scheme.	Government RIS	No	
4	C2	3	As a combination of interventions there is the opportunity to remove elements should funding change, allowing for relatively significant changes in scale of the overall scheme.	Government RIS	No	
5	C3	4	As a combination of interventions there is the opportunity to remove elements should funding change, allowing for significant changes in scale of the overall scheme.	Government RIS	No	
6	C4	4	As a combination of interventions there is the opportunity to remove elements should funding change, allowing for significant changes in scale of the overall scheme.	Government RIS	No	
7	C5	3	As a combination of interventions there is the opportunity to remove elements should funding change, allowing for relatively significant changes in scale of the overall scheme.	Government RIS	No	
8	C6	3	As a combination of interventions there is the opportunity to remove elements should funding change, allowing for significant changes in scale of the overall scheme.	Government RIS	No	
9	C7	4	As a combination of interventions there is the opportunity to remove elements should funding change, allowing for significant changes in scale of the overall scheme.	Government RIS	No	
10	C8	4	As a combination of interventions there is the opportunity to remove elements should funding change, allowing for relatively significant changes in scale of the overall scheme.	Government RIS	No	
11	C9	3	As a combination of interventions there is the opportunity to remove elements should funding change, allowing for significant changes in scale of the overall scheme.	Government RIS	No	
12	C10	5. Dynamic	As a combination smaller scale and junction improvement interventions with no length stretches of dualling it is likely that the scheme could be easily reduced in scale should funding change	Government RIS	No	
13	C11	5. Dynamic	As a combination smaller scale and junction improvement interventions with no length stretches of dualling it is likely that the scheme could be easily reduced in scale should funding change	Government RIS	No	
14	C13	3	Given the small length of dualling and minor improvements the junction is likely that the scope to scale the scheme will be somewhat limited. However, it would be possible to only complete one component or the other allowing for some flexibility.	Government RIS	No	
15	C14	3	As a combination of a large junction improvement and a minor junction improvement there is some movement to scale the scheme if funding changes.	Government RIS	No	
16	C16	4	As a combination of interventions there is the opportunity to remove elements should funding change, allowing for significant changes in scale of the overall scheme.	Government's funding of the first RIS period	No	

Appendix J. Option Assessment Framework

DfT option assessment framework	
Case	**Assessment area**
Strategic case The strategic case determines whether or not an investment is needed, either now or in the future. It demonstrates the case for change – that is, a clear rationale for making the investment; and strategic fit, how an investment will further the aims and objectives of the organisation.	
	Regional Policy
	Local Policy
	Route Objectives 'strategic fit'
Economic Case The economic case considers the Economic, Environmental and Social Impacts which when combined with estimated costs determine the overall Value for Money of a proposal.	
- Economic Impacts	Business Users and Transport Providers
	Reliability
	Regeneration
	Wider Impacts
- Environmental Impacts	Noise
	Air Quality
	Greenhouse Gases
	Landscape
	Townscape
	Historic Environment
	Biodiversity
	Water Environment
- Social Impacts	Non-business users
	Physical Activity
	Journey Quality
	Accidents
	Security
	Access to services
	Affordability
	Severance
	Option Values

DfT option assessment framework	
Case	**Assessment area**
- Public Accounts	Cost to the broad transport budget
	Indirect Tax Revenues
- Distributional Impacts	
- Indicative BCR	
Financial Case The Financial Case of the scheme considers the cost of the scheme (both the initial development and construction costs, and the later operating and maintenance costs). It also considers significant risks that may impact upon those costs and considers the likely funding source(s) for a scheme.	
- Capital and Revenue Costs	Outturn costs to implement
	Operating and maintenance costs
- Funding Assumptions	Funding assumptions and allocations
Management / Delivery Case The management case assesses whether a proposal is deliverable. It tests the project planning, governance structure, risk management, communications and stakeholder management, benefits realisation and assurance (e.g. a Gateway Review). There should be a clear and agreed understanding of what needs to be done, why, when and how, with measures in place to identify and manage any risks. The management case sets out a plan to ensure that the benefits set out in the economic case are realised and will include measures to assess and evaluate this. All projects and programmes are expected to have a risk management plan, proportionate to their scale.	
	Likely delivery agents
	Stakeholder acceptability
	Public acceptability
Commercial Case The commercial case provides evidence on the commercial viability of a proposal and the procurement strategy that will be used to engage the market. It should clearly set out the financial implications of the proposed procurement strategy. It presents evidence on risk allocation and transfer, contract timescales and implementation timescale as well as details of the capability and skills of the team delivering the project and any personnel implications arising from the proposal.	
	Route to market
	Difficulty / risks

JACOBS

Appendix K. Appraisal Summary Tables

Appraisal Summary Table

Date produced:	1	12	2015

Contact:	
Name	TBC
Organisation	Highways England
Role	Promoter/Official

Name of scheme:	Option C1
Description of scheme:	A428 full offline dualling with grade separation of Black Cat roundabout and grade separation of Caxton Gibbet roundabout

Impacts		Summary of key impacts	Assessment				
			Quantitative			Qualitative	Monetary £(NPV)	Distributional 7-pt scale/ vulnerable grp
Economy	Business users & transport providers	The scheme is likely to improve journey times along the route and remove queuing for key movements at major junctions, therefore providing significant benefits.	Value of journey time changes(£)			Large Beneficial	£359m	
			Net journey time changes (£)					
			0 to 2min	2 to 5min	> 5min			
	Reliability impact on Business users	Journey time reliability has been highlighted as a key problem on the route and this scheme would likely significantly improve the consistency of journey times.				Large Beneficial		
	Regeneration	Not assessed at this stage						
	Wider Impacts	Not assessed at this stage						
Environmental	Noise	The scheme is likely to improve noise levels in the noise improvement areas around Wyboston. A route corridor to the north of the existing road would also improve noise levels in the existing				Moderate beneficial		
	Air Quality	Reduction in queueing is likely to result in an improvement to air quality. A bypass route that is located further away from St Neots is also likely to improve local air quality.				Slight beneficial		
	Greenhouse gases	Not assessed at this stage	Change in non-traded carbon over 60y (CO2e)			Unknown		
			Change in traded carbon over 60y (CO2e)					
	Landscape	A new bypass route with grade separated junctions could result in significant effects on the local landscape. The route will need to be designed to avoid sensitve view points e.g. from Croxton Park. A landscape assessment would be required at the next stage to help inform the alignment of the route as part of making use of existing landscape features to minimise the visual intrusion e.g. minimising impacting mature trees which could screen the route and making use of local landforms.				Large adverse		
	Townscape	Not assessed at this stage				Neutral		
	Historic Environment	The new route has the potential for significant effects on archaeology and the historic environment, particularly if located to the south of the existing A428. Croxton Park is a registered park and garden and Scheduled Monument and the surrounding landscape has a number of known archaeological sites. A detailed programme of archaeological mitigation is likely to be required. A route to the north of the the existing A428 is likely to result in a much reduced qualitative effect than a route to the south.				Large adverse		
	Biodiversity	There are no nationally designated sites affected by the route but there is the potential for impacts to protected species and local habitats. An ecology survey will be required at the next stage to advise on sensitive areas to avoid and to inform the detailed programme regarding surveys and consents.				Slight adverse		
	Water Environment	The route will cross the floodplain of the River Ouse and its tributaries. This will require an assessment under the Water Framework Directive and the likely need for a flood risk assessment. Mitigation will be required for any loss of floodplain or barrier to flows. This is likely to involve non-standard mitigation which will need to be agreed with the Environment Agency.				Moderate adverse		
Social	Commuting and Other users	The scheme is likely to improve journey times along the route and remove queuing for key movements at major junctions, therefore providing significant benefits.	Value of journey time changes(£)				£390m	
			Net journey time changes (£)					
			0 to 2min	2 to 5min	> 5min			
	Reliability impact on Commuting and Other users	Journey time reliability has been highlighted as a key problem on the route and this scheme would likely significantly improve the consistency of journey times.				Large Beneficial		
	Physical activity	The scheme is unlikely to lead to a significant increase in the number of people walking or cycling in the area as it is a primarily highways scheme. Some existing Public rights of way and cycle paths will be impacted by the scheme; however any design is likely to include new footpaths and cycle ways mitigating the impact of these lost facilities. Therefore, it is unlikely that this scheme will lead to an increase in the number of people walking and cycling or the distance that current users travel and has been assessed as having a neutral impact on physical activity.				Slight benefical		
	Journey quality	The scheme is likely to reduce congestion and improve jourmey times leading to reduced traveller stress alongside making travel along the A428 less confusing for unfamiliar travellers through having less at grade junctions.				Large Beneficial		
	Accidents	Not assessed at this stage						
	Security	The scheme is unlikely to have any impact on security for users at the route				Neutral		
	Access to services	The scheme is unlikely to impact the availability and cost of public transport which will lead to an improvement or worsening of the existing ability of non-car users to access services.				Neutral		
	Affordability	The scheme is unlikely to impact the cost of travel for users.				Neutral		
	Severance	The scheme does not propose to remove or add distance to any existing access routes for NMUs and it is therefore unlikely to lead to increase severance. It is likely that decreased traffic on the detrunked A428 near Croxton and Eltisley will reduce severance in this area by creating a road environment more amenable to NMUs.				Moderate Beneficial		
	Option and non-use values	The scheme does not propose any changes to the existing public transport services.				Neutral		
Public Account	Cost to Broad Transport Budget	Highways England Commercial have estimated scheme cost at £1bn in 2014 prices					£707m	
	Indirect Tax Revenues	Not assessed at this stage						

Appraisal Summary Table

Date produced:	1	12	2015

Contact:	
Name	TBC
Organisation	Highways England
Role	Promoter/Official

Name of scheme:	Option C2
Description of scheme:	A428 full offline dualling with grade separation of Black Cat roundabout and signalisation of Caxton Gibbet roundabout

Impacts		Summary of key impacts	Assessment			
			Quantitative	Qualitative	Monetary £(NPV)	Distributional 7-pt scale/ vulnerable grp
Economy	Business users & transport providers	The scheme is likely to improve journey times along the route and remove queuing for key movements at major junctions, therefore providing significant benefits.	Value of journey time changes(£) Net journey time changes (£) 0 to 2min / 2 to 5min / > 5min	Large Beneficial	£331m	
	Reliability impact on Business users	Journey time reliability has been highlighted as a key problem on the route and this scheme would likely significantly improve the consistency of journey times.		Large Beneficial		
	Regeneration	Not assessed at this stage				
	Wider Impacts	Not assessed at this stage				
Environmental	Noise	The scheme is likely to improve noise levels in the noise improvement areas around Wyboston. A route corridor to the north of the existing road would also improve noise levels in the existing		Moderate beneficial		
	Air Quality	Reduction in queueing is likely to result in an improvement to air quality. A bypass route that is located further away from St Neots is also likely to improve local air quality.		Slight beneficial		
	Greenhouse gases	Not assessed at this stage	Change in non-traded carbon over 60y (CO2e) Change in traded carbon over 60y (CO2e)	Unknown		
	Landscape	A new bypass route with grade separated junctions could result in significant effects on the local landscape. The route will need to be designed to avoid sensitve view points e.g. from Croxton Park. A landscape assessment would be required at the next stage to help inform the alignment of the route as part of making use of existing landscape features to minimise the visual intrusion e.g. minimising impacting mature trees which could screen the route and making use of local landforms.		Large adverse		
	Townscape	Not assessed at this stage		Neutral		
	Historic Environment	The new route has the potential for significant effects on archaeology and the historic environment, particularly if located to the south of the existing A428. Croxton Park is a registered park and garden and Scheduled Monument and the surrounding landscape has a number of known archaeological sites. A detailed programme of archaeological mitigation is likely to be required. A route to the north of the the existing A428 is likely to result in a much reduced qualitative effect than a route to the south.		Large adverse		
	Biodiversity	There are no nationally designated sites affected by the route but there is the potential for impacts to protected species and local habitats. An ecology survey will be required at the next stage to advise on sensitive areas to avoid and to inform the detailed programme regarding surveys and consents.		Slight adverse		
	Water Environment	The route will cross the floodplain of the River Ouse and its tributaries. This will require an assessment under the Water Framework Directive and the likely need for a flood risk assessment. Mitigation will be required for any loss of floodplain or barrier to flows. This is likely to involve non-standard mitigation which will need to be agreed with the Environment Agency.		Moderate adverse		
Social	Commuting and Other users	The scheme is likely to improve journey times along the route and remove queuing for key movements at major junctions, therefore providing significant benefits.	Value of journey time changes(£) Net journey time changes (£) 0 to 2min / 2 to 5min / > 5min		£363m	
	Reliability impact on Commuting and Other users	Journey time reliability has been highlighted as a key problem on the route and this scheme would likely significantly improve the consistency of journey times.		Large Beneficial		
	Physical activity	The scheme is unlikely to lead to a significant increase in the number of people walking or cycling in the area as it is a primarily highways scheme. Some existing Public rights of way and cycle paths will be impacted by the scheme; however any design is likely to include new footpaths and cycle ways mitigating the impact of these lost facilities. Therefore, it is unlikely that this scheme will lead to an increase in the number of people walking and cycling or the distance that current users travel and has been assessed as having a neutral impact on physical activity.		Slight benefical		
	Journey quality	The scheme is likely to reduce congestion and improve jourmey times leading to reduced traveller stress alongside making travel along the A428 less confusing for unfamiliar travellers through having less at grade junctions.		Large Beneficial		
	Accidents	Not assessed at this stage				
	Security	The scheme is unlikely to have any impact on security for users at the route		Neutral		
	Access to services	The scheme is unlikely to impact the availability and cost of public transport which will lead to an improvement or worsening of the existing ability of non-car users to access services.		Neutral		
	Affordability	The scheme is unlikely to impact the cost of travel for users.		Neutral		
	Severance	The scheme does not propose to remove or add distance to any existing access routes for NMUs and it is therefore unlikely to lead to increase severance. It is likely that decreased traffic on the detrunked A428 near Croxton and Eltisley will reduce severance in this area by creating a road environment more amenable to NMUs.		Moderate Beneficial		
	Option and non-use values	The scheme does not propose any changes to the existing public transport services.		Neutral		
Public Account	Cost to Broad Transport Budget	Highways England Commercial have estimated scheme cost at £1bn in 2014 prices			£354m-£707m	
	Indirect Tax Revenues	Not assessed at this stage				

Appraisal Summary Table

Date produced:	1	12	2015

Contact:	
Name	TBC
Organisation	Highways England
Role	Promoter/Official

Name of scheme:	Option C5
Description of scheme:	A428 bypass to Cambridge Road roundabout with grade separation at Black Cat, and grade separation at Caxton Gibbet roundabout

Impacts		Summary of key impacts	Assessment			
			Quantitative	Qualitative	Monetary £(NPV)	Distributional 7-pt scale/ vulnerable grp
Economy	Business users & transport providers	The scheme is likely to improve journey times along the route and remove queuing for key movements at major junctions, therefore providing significant benefits.	Value of journey time changes(£) Net journey time changes (£) 0 to 2min / 2 to 5min / > 5min	Large Beneficial	£234m	
	Reliability impact on Business users	Journey time reliability has been highlighted as a key problem on the route and this scheme would likely significantly improve the consistency of journey times.		Large Beneficial		
	Regeneration	Not assessed at this stage				
	Wider Impacts	Not assessed at this stage				
Environmental	Noise	The scheme is likely to improve noise levels in the noise improvement areas around Wyboston. Increasing traffic along the existing road will noise levels to properties along the existing road and may require additional mitigation.		Minor beneficial		
	Air Quality	Reduction in queueing is likely to result in an improvement to air quality. A bypass route that is located further away from St Neots is also likely to improve local air quality.		Slight beneficial		
	Greenhouse gases	Not assessed at this stage	Change in non-traded carbon over 60y (CO2e) Change in traded carbon over 60y (CO2e)	Unknown		
	Landscape	A new bypass route with a grade separated junctions could result in significant effects on the local landscape. A landscape assessment would be required at the next stage to help inform the alignment of the route as part of making use of existing landscape features to minimise the visual intrusion e.g. minimising impacting mature trees which could screen the route and making use of local landforms.		Large adverse		
	Townscape	Not assessed at this stage		Neutral		
	Historic Environment	The new route has the potential for significant effects on archaeology due to being located through green field sites. A detailed programme of archaeological mitigation is likely to be required.		Moderate adverse		
	Biodiversity	There are no nationally designated sites affected by the route but there is the potential for impacts to protected species and local habitats. An ecology survey will be required at the next stage to advise on sensitive areas to avoid and to inform the detailed programme regarding surveys and consents.		Slight adverse		
	Water Environment	The route will cross the floodplain of the River Ouse and its tributaries. This will require an assessment under the Water Framework Directive and the likely need for a flood risk assessment. Mitigation will be required for any loss of floodplain or barrier to flows. This is likely to involve non-standard mitigation which will need to be agreed with the Environment Agency.		Moderate adverse		
Social	Commuting and Other users	The scheme is likely to improve journey times along the route and remove queuing for key movements at major junctions, therefore providing significant benefits.	Value of journey time changes(£) Net journey time changes (£) 0 to 2min / 2 to 5min / > 5min		£247m	
	Reliability impact on Commuting and Other users	Journey time reliability has been highlighted as a key problem on the route and this scheme would likely significantly improve the consistency of journey times.		Large Beneficial		
	Physical activity	The scheme is unlikely to lead to a significant increase in the number of people walking or cycling in the area as it is a primarily highways scheme. Some existing Public rights of way and cycle paths will be impacted by the scheme; however any design is likely to include new footpaths and cycle ways mitigating the impact of these lost facilities. Therefore, it is unlikely that this scheme will lead to an increase in the number of people walking and cycling or the distance that current users travel and has been assessed as having a neutral impact on physical activity.		Neutral		
	Journey quality	The scheme is assessed as having neutral impacts on Traveller Care and Travellers' Views while also having beneficial impacts on Frustration and Fear of potential accidents. Therefore the scheme is awarded an overall score of "Beneficial".		Moderate beneficial		
	Accidents	Not assessed at this stage				
	Security	The scheme is unlikely to have any impact on security for users at the route		Neutral		
	Access to services	The scheme is unlikely to impact the availability and cost of public transport which will lead to an improvement or worsening of the existing ability of non-car users to access services.		Neutral		
	Affordability	The scheme is unlikely to impact the cost of travel for users.		Neutral		
	Severance	The scheme is considered to have negligible impact on the current severance situation. The option it is very unlikely to have any impact on Public rights of way and cycle paths.		Neutral		
	Option and non-use values	The scheme does not propose any changes to the existing public transport services.		Neutral		
Public Accou	Cost to Broad Transport Budget	Highways England Commercial have estimated scheme cost at £1bn in 2014 prices			£177m-£354m	
	Indirect Tax Revenues	Not assessed at this stage				

Appraisal Summary Table

Date produced:	1	12	2015

Contact:	
Name	TBC
Organisation	Highways England
Role	Promoter/Official

Name of scheme:	Option C6
Description of scheme:	A428 bypass to Cambridge Road roundabout with grade separation at Black Cat roundabout, and signalisation at Caxton Gibbet roundabout

Impacts		Summary of key impacts	Assessment				
			Quantitative			Qualitative	Monetary £(NPV)	Distributional 7-pt scale/ vulnerable grp
Economy	Business users & transport providers	The scheme is likely to improve journey times along the route and remove queuing for key movements at major junctions, therefore providing significant benefits.	Value of journey time changes(£)			Large Beneficial	£206m	
			Net journey time changes (£)					
			0 to 2min	2 to 5min	> 5min			
	Reliability impact on Business users	Journey time reliability has been highlighted as a key problem on the route and this scheme would likely significantly improve the consistency of journey times.				Large Beneficial		
	Regeneration	Not assessed at this stage						
	Wider Impacts	Not assessed at this stage						
Environmental	Noise	The scheme is likely to improve noise levels in the noise improvement areas around Wyboston. Increasing traffic along the existing road will noise levels to properties along the existing road and may require additional mitigation.				Minor beneficial		
	Air Quality	Reduction in queueing is likely to result in an improvement to air quality. A bypass route that is located further away from St Neots is also likely to improve local air quality.				Slight beneficial		
	Greenhouse gases	Not assessed at this stage	Change in non-traded carbon over 60y (CO2e)			Unknown		
			Change in traded carbon over 60y (CO2e)					
	Landscape	A new bypass route with a grade separated junction could result in significant effects on the local landscape. A landscape assessment would be required at the next stage to help inform the alignment of the route as part of making use of existing landscape features to minimise the visual intrusion e.g. minimising impacting mature trees which could screen the route and making use of local landforms.				Large adverse		
	Townscape	Not assessed at this stage				Neutral		
	Historic Environment	The new route has the potential for significant effects on archaeology due to being located through green field sites. A detailed programme of archaeological mitigation is likely to be required.				Moderate adverse		
	Biodiversity	There are no nationally designated sites affected by the route but there is the potential for impacts to protected species and local habitats. An ecology survey will be required at the next stage to advise on sensitive areas to avoid and to inform the detailed programme regarding surveys and consents.				Slight adverse		
	Water Environment	The route will cross the floodplain of the River Ouse and its tributaries. This will require an assessment under the Water Framework Directive and the likely need for a flood risk assessment. Mitigation will be required for any loss of floodplain or barrier to flows. This is likely to involve non-standard mitigation which will need to be agreed with the Environment Agency.				Moderate adverse		
Social	Commuting and Other users	The scheme is likely to improve journey times along the route and remove queuing for key movements at major junctions, therefore providing significant benefits.	Value of journey time changes(£)				£220m	
			Net journey time changes (£)					
			0 to 2min	2 to 5min	> 5min			
	Reliability impact on Commuting and Other users	Journey time reliability has been highlighted as a key problem on the route and this scheme would likely significantly improve the consistency of journey times.				Large Beneficial		
	Physical activity	The scheme is unlikely to lead to a significant increase in the number of people walking or cycling in the area as it is a primarily highways scheme. Some existing Public rights of way and cycle paths will be impacted by the scheme; however any design is likely to include new footpaths and cycle ways mitigating the impact of these lost facilities. Therefore, it is unlikely that this scheme will lead to an increase in the number of people walking and cycling or the distance that current users travel and has been assessed as having a neutral impact on physical activity.				Neutral		
	Journey quality	The scheme is assessed as having neutral impacts on Traveller Care and Travellers' Views while also having beneficial impacts on Frustration and Fear of potential accidents. Therefore the scheme is awarded an overall score of "Beneficial".				Moderate beneficial		
	Accidents	Not assessed at this stage						
	Security	The scheme is unlikely to have any impact on security for users at the route				Neutral		
	Access to services	The scheme is unlikely to impact the availability and cost of public transport which will lead to an improvement or worsening of the existing ability of non-car users to access services.				Neutral		
	Affordability	The scheme is unlikely to impact the cost of travel for users.				Neutral		
	Severance	The scheme is considered to have negligible impact on the current severance situation. The option it is very unlikely to have any impact on Public rights of way and cycle paths.				Neutral		
	Option and non-use values	The scheme does not propose any changes to the existing public transport services.				Neutral		
Public Accou	Cost to Broad Transport Budget	Highways England Commercial have estimated scheme cost at £1bn in 2014 prices					£177m-£354m	
	Indirect Tax Revenues	Not assessed at this stage						

Appraisal Summary Table

Date produced:	1	12	2015

Contact:	
Name	TBC
Organisation	Highways England
Role	Promoter/Official

Name of scheme:	Option C7
Description of scheme:	A428 single lane carriageway bypass to Cambridge Road roundabout with online dualling between Cambridge Road roundabout and Caxton Gibbet roundabout, grade separation at Black Cat roundabout and grade separation at Caxton Gibbet roundabout

Impacts		Summary of key impacts	Assessment			
			Quantitative	Qualitative	Monetary £(NPV)	Distributional 7-pt scale/ vulnerable grp
Economy	Business users & transport providers	The scheme is likely to improve journey times along the route and remove queuing for key movements at major junctions, therefore providing significant benefits.	Value of journey time changes(£) Net journey time changes (£) 0 to 2min / 2 to 5min / > 5min	Large Beneficial	£293m	
	Reliability impact on Business users	Journey time reliability has been highlighted as a key problem on the route and this scheme would likely significantly improve the consistency of journey times.		Large Beneficial		
	Regeneration	Not assessed at this stage				
	Wider Impacts	Not assessed at this stage				
Environmental	Noise	The scheme is likely to improve noise levels in the noise improvement areas around Wyboston. A route corridor to the north of the existing road would also improve noise levels in the existing		Moderate beneficial		
	Air Quality	Reduction in queueing is likely to result in an improvement to air quality. A bypass route that is located further away from St Neots is also likely to improve local air quality.		Slight beneficial		
	Greenhouse gases	Not assessed at this stage	Change in non-traded carbon over 60y (CO2e) Change in traded carbon over 60y (CO2e)	Unknown		
	Landscape	A new bypass route with grade separated junctions could result in significant effects on the local landscape. The route will need to be designed to avoid sensitve view points e.g. from Croxton Park. A landscape assessment would be required at the next stage to help inform the alignment of the route as part of making use of existing landscape features to minimise the visual intrusion e.g. minimising impacting mature trees which could screen the route and making use of local landforms.		Large adverse		
	Townscape	Not assessed at this stage		Neutral		
	Historic Environment	The new route has the potential for significant effects on archaeology and the historic environment, particularly if located to the south of the existing A428. Croxton Park is a registered park and garden and Scheduled Monument and the surrounding landscape has a number of known archaeological sites. A detailed programme of archaeological mitigation is likely to be required. The online wideing in the area of Croxton Park is likely to result in a significant effect on the heritage features.		Large adverse		
	Biodiversity	There are no nationally designated sites affected by the route but there is the potential for impacts to protected species and local habitats. An ecology survey will be required at the next stage to advise on sensitive areas to avoid and to inform the detailed programme regarding surveys and consents.		Slight adverse		
	Water Environment	The route will cross the floodplain of the River Ouse and its tributaries. This will require an assessment under the Water Framework Directive and the likely need for a flood risk assessment. Mitigation will be required for any loss of floodplain or barrier to flows. This is likely to involve non-standard mitigation which will need to be agreed with the Environment Agency.		Moderate adverse		
Social	Commuting and Other users	The scheme is likely to improve journey times along the route and remove queuing for key movements at major junctions, therefore providing significant benefits.	Value of journey time changes(£) Net journey time changes (£) 0 to 2min / 2 to 5min / > 5min		£313m	
	Reliability impact on Commuting and Other users	Journey time reliability has been highlighted as a key problem on the route and this scheme would likely significantly improve the consistency of journey times.		Large Beneficial		
	Physical activity	The scheme is unlikely to lead to a significant increase in the number of people walking or cycling in the area as it is a primarily highways scheme. Some existing Public rights of way and cycle paths will be impacted by the scheme; however any design is likely to include new footpaths and cycle ways mitigating the impact of these lost facilities. Therefore, it is unlikely that this scheme will lead to an increase in the number of people walking and cycling or the distance that current users travel and has been assessed as having a neutral impact on physical activity.		Neutral		
	Journey quality	The scheme is assessed as having neutral impacts on Traveller Care and Travellers' Views while also having beneficial impacts on Frustration and Fear of potential accidents. Therefore the scheme is awarded an overall score of "Beneficial".		Moderate beneficial		
	Accidents	Not assessed at this stage.				
	Security	The scheme is unlikely to have any impact on security for users at the route.		Neutral		
	Access to services	The scheme is unlikely to impact the availability and cost of public transport which will lead to an improvement or worsening of the existing ability of non-car users to access services.		Neutral		
	Affordability	The scheme is unlikely to impact the cost of travel for users.		Neutral		
	Severance	The scheme is considered to have negligible impact on the current severance situation. The option it is very unlikely to have any impact on Public rights of way and cycle paths.		Neutral		
	Option and non-use values	The scheme does not propose any changes to the existing public transport services.		Neutral		
Public Account	Cost to Broad Transport Budget	Highways England Commercial have estimated scheme cost at £1bn in 2014 prices			£354m	
	Indirect Tax Revenues	Not assessed at this stage				

Appraisal Summary Table

Date produced:	6	11	2015

Contact:	
Name	TBC
Organisation	Highways England
Role	Promoter/Official

Name of scheme:	Option C10
Description of scheme:	Local junction widening with channelisation at existing A428 junctions, grade separation at Caxton Gibbet roundabout, grade separation at Black Cat roundabout and upgrade to existing A1 junctions

Impacts		Summary of key impacts	Assessment			
			Quantitative	Qualitative	Monetary £(NPV)	Distributional 7-pt scale/ vulnerable grp
Economy	Business users & transport providers	The scheme is likely to improve journey times along the route and remove queuing for key movements at major junctions, therefore providing significant benefits.	Value of journey time changes(£) Net journey time changes (£): 0 to 2min / 2 to 5min / > 5min	Moderate Beneficial	£95m	
	Reliability impact on Business users	Journey time reliability has been highlighted as a key problem on the route and this scheme would likely significantly improve the consistency of journey times.		Moderate Beneficial		
	Regeneration	Not assessed at this stage				
	Wider Impacts	Not assessed at this stage				
Environmental	Noise	The scheme is likely to increase noise levels in the noise levels in the noise improvement areas around Wyboston. This is likely to require mitigation.		Moderate adverse		
	Air Quality	Reduction in queueing may result in an improvement to air quality but this could be offset by an increase in desirability of the route. The route will remain close to the residential properties in St Neots.		Neutral		
	Greenhouse gases	Not assessed at this stage	Change in non-traded carbon over 60y (CO_2e) Change in traded carbon over 60y (CO_2e)	Unknown		
	Landscape	The widening with grade separated junctions could result in significant effects on the local landscape. The route will need to be designed to avoid sensitve view points e.g. from Croxton Park. A landscape assessment would be required at the next stage to help inform the alignment of the route as part of making use of existing landscape features to minimise the visual intrusion e.g. minimising impacting mature trees which could screen the route and making use of local landforms.		Moderate adverse		
	Townscape	Not assessed at this stage		Neutral		
	Historic Environment	The new route has the potential for significant effects on archaeology and the historic environment. Croxton Park is a registered park and garden and Scheduled Monument and the surrounding landscape has a number of known archaeological sites. A detailed programme of archaeological mitigation is likely to be required.		Moderate adverse		
	Biodiversity	There are no nationally designated sites affected by the route but there is the potential for impacts to protected species and local habitats. An ecology survey will be required at the next stage to advise on sensitive areas to avoid and to inform the detailed programme regarding surveys and consents.		Slight adverse		
	Water Environment	The existing road crosses the floodplain of the River Ouse and its tributaries. This will require an assessment under the Water Framework Directive and the likely need for a flood risk assessment. Mitigation will be required for any loss of floodplain or barrier to flows. This is likely to involve non-standard mitigation which will need to be agreed with the Environment Agency.		Minor adverse		
Social	Commuting and Other users	The scheme is likely to improve journey times along the route and remove queuing for key movements at major junctions, therefore providing significant benefits.	Value of journey time changes(£) Net journey time changes (£): 0 to 2min / 2 to 5min / > 5min		£87m	
	Reliability impact on Commuting and Other users	Journey time reliability has been highlighted as a key problem on the route and this scheme would likely significantly improve the consistency of journey times.		Moderate Beneficial		
	Physical activity	The scheme is unlikely to lead to a significant increase in the number of people walking or cycling in the area as it is a primarily highways scheme. Some existing Public rights of way and cycle paths will be impacted by the scheme; however any design is likely to include new footpaths and cycle ways mitigating the impact of these lost facilities. Therefore, it is unlikely that this scheme will lead to an increase in the number of people walking and cycling or the distance that current users travel and has been assessed as having a neutral impact on physical activity		Neutral		
	Journey quality	The scheme is likely to reduce congestion and improve jourmey times leading to reduced traveller stress		Large Beneficial		
	Accidents	Not assessed at this stage				
	Security	The scheme is unlikely to have any impact on security for users at the route		Neutral		
	Access to services	The scheme is unlikely to impact the availability and cost of public transport which will lead to an improvement or worsening of the existing ability of non-car users to access services.		Neutral		
	Affordability	Th scheme is unlikely to impact the cost of travel for users.		Neutral		
	Severance	The scheme is considered to have negligible impact on the current severance situation. The option it is very unlikely to have any impact on Public rights of way and cycle paths.		Neutral		
	Option and non-use values	The scheme does not propose any changes to the existing public transport services.		Neutral		
Public Account	Cost to Broad Transport Budget	Highways England Commercial have estimated scheme cost at £1bn in 2014 prices			£71m-£177m	
	Indirect Tax Revenues	Not assessed at this stage				

Appraisal Summary Table

Date produced:	6	11	2015

Contact:	
Name	TBC
Organisation	Highways England
Role	Promoter/Official

Name of scheme:	Option C11
Description of scheme:	Local junction widening with channelisation at existing A428 junctions, signalisation at Caxton Gibbet roundabout, grade separation at Black Cat roundabout and upgrade to existing A1 junctions

Impacts		Summary of key impacts	Assessment			
			Quantitative	Qualitative	Monetary £(NPV)	Distributional 7-pt scale/ vulnerable grp
Economy	Business users & transport providers	The scheme is likely to improve journey times along the route and remove queuing for key movements at major junctions, therefore providing significant benefits.	Value of journey time changes(£) Net journey time changes (£) 0 to 2min / 2 to 5min / > 5min	Moderate Beneficial	£67m	
	Reliability impact on Business users	Journey time reliability has been highlighted as a key problem on the route and this scheme would likely significantly improve the consistency of journey times.		Moderate Beneficial		
	Regeneration	Not assessed at this stage				
	Wider Impacts	Not assessed at this stage				
Environmental	Noise	The scheme is likely to increase noise levels in the noise levels in the noise improvement areas around Wyboston. This is likely to require mitigation.		Moderate adverse		
	Air Quality	Reduction in queueing may result in an improvement to air quality but this could be offset by an increase in desirability of the route. The route will remain close to the residential properties in St Neots.		Neutral		
	Greenhouse gases	Not assessed at this stage	Change in non-traded carbon over 60y (CO_2e) Change in traded carbon over 60y (CO_2e)	Unknown		
	Landscape	The widening with a grade separated junction could result in significant effects on the local landscape. The route will need to be designed to avoid sensitve view points e.g. from Croxton Park. A landscape assessment would be required at the next stage to help inform the alignment of the route as part of making use of existing landscape features to minimise the visual intrusion e.g. minimising impacting mature trees which could screen the route and making use of local landforms.		Moderate adverse		
	Townscape	Not assessed at this stage		Neutral		
	Historic Environment	The new route has the potential for significant effects on archaeology and the historic environment. Croxton Park is a registered park and garden and Scheduled Monument and the surrounding landscape has a number of known archaeological sites. A detailed programme of archaeological mitigation is likely to be required.		Moderate adverse		
	Biodiversity	There are no nationally designated sites affected by the route but there is the potential for impacts to protected species and local habitats. An ecology survey will be required at the next stage to advise on sensitive areas to avoid and to inform the detailed programme regarding surveys and consents.		Slight adverse		
	Water Environment	The existing road crosses the floodplain of the River Ouse and its tributaries. This will require an assessment under the Water Framework Directive and the likely need for a flood risk assessment. Mitigation will be required for any loss of floodplain or barrier to flows. This is likely to involve non-standard mitigation which will need to be agreed with the Environment Agency.		Minor adverse		
Social	Commuting and Other users	The scheme is likely to improve journey times along the route and remove queuing for key movements at major junctions, therefore providing significant benefits.	Value of journey time changes(£) Net journey time changes (£) 0 to 2min / 2 to 5min / > 5min		£60m	
	Reliability impact on Commuting and Other users	Journey time reliability has been highlighted as a key problem on the route and this scheme would likely significantly improve the consistency of journey times.		Moderate Beneficial		
	Physical activity	The scheme is unlikely to lead to a significant increase in the number of people walking or cycling in the area as it is a primarily highways scheme. Some existing Public rights of way and cycle paths will be impacted by the scheme; however any design is likely to include new footpaths and cycle ways mitigating the impact of these lost facilities. Therefore, it is unlikely that this scheme will lead to an increase in the number of people walking and cycling or the distance that current users travel and has been assessed as having a neutral impact on physical activity		Neutral		
	Journey quality	The scheme is likely to reduce congestion and improve jourmey times leading to reduced traveller stress		Moderate Beneficial		
	Accidents	Not assessed at this stage				
	Security	The scheme is unlikely to have any impact on security for users at the route		Neutral		
	Access to services	The scheme is unlikely to impact the availability and cost of public transport which will lead to an improvement or worsening of the existing ability of non-car users to access services.		Neutral		
	Affordability	Th scheme is unlikely to impact the cost of travel for users.		Neutral		
	Severance	The scheme is considered to have negligible impact on the current severance situation. The option it is very unlikely to have any impact on Public rights of way and cycle paths.		Neutral		
	Option and non-use values	The scheme does not propose any changes to the existing public transport services.		Neutral		
Public Account	Cost to Broad Transport Budget	Highways England Commercial have estimated scheme cost at £1bn in 2014 prices			£71m-£177m	
	Indirect Tax Revenues	Not assessed at this stage				

Appraisal Summary Table

Date produced:	4	12	2015

Contact:	
Name	TBC
Organisation	Highways England
Role	Promoter/Official

Name of scheme:	Option C16
Description of scheme:	A428 dual carriageway bypass to Cambridge Road roundabout with online dualling between Cambridge Road roundabout and Caxton Gibbet roundabout, grade separation at Black Cat roundabout and grade separation at Caxton Gibbet roundabout

Impacts		Summary of key impacts	Assessment			
			Quantitative	Qualitative	Monetary £(NPV)	Distributional 7-pt scale/ vulnerable grp
Economy	Business users & transport providers	The scheme is likely to improve journey times along the route and remove queuing for key movements at major junctions, therefore providing significant benefits.	Value of journey time changes(£) Net journey time changes (£) 0 to 2min / 2 to 5min / > 5min	Large Beneficial	£307m	
	Reliability impact on Business users	Journey time reliability has been highlighted as a key problem on the route and this scheme would likely significantly improve the consistency of journey times.		Large Beneficial		
	Regeneration	Not assessed at this stage				
	Wider Impacts	Not assessed at this stage				
Environmental	Noise	The scheme is likely to improve noise levels in the noise improvement areas around Wyboston. A route corridor to the north of the existing road would also improve noise levels in the existing		Moderate beneficial		
	Air Quality	Reduction in queueing is likely to result in an improvement to air quality. A bypass route that is located further away from St Neots is also likely to improve local air quality.		Slight beneficial		
	Greenhouse gases	Not assessed at this stage	Change in non-traded carbon over 60y (CO2e) Change in traded carbon over 60y (CO2e)	Unknown		
	Landscape	A new bypass route with grade separated junctions could result in significant effects on the local landscape. The route will need to be designed to avoid sensitve view points e.g. from Croxton Park. A landscape assessment would be required at the next stage to help inform the alignment of the route as part of making use of existing landscape features to minimise the visual intrusion e.g. minimising impacting mature trees which could screen the route and making use of local landforms.		Large adverse		
	Townscape	Not assessed at this stage		Neutral		
	Historic Environment	The new route has the potential for significant effects on archaeology and the historic environment, particularly if located to the south of the existing A428. Croxton Park is a registered park and garden and Scheduled Monument and the surrounding landscape has a number of known archaeological sites. A detailed programme of archaeological mitigation is likely to be required. The online wideing in the area of Croxton Park is likely to result in a significant effect on the heritage features.		Large adverse		
	Biodiversity	There are no nationally designated sites affected by the route but there is the potential for impacts to protected species and local habitats. An ecology survey will be required at the next stage to advise on sensitive areas to avoid and to inform the detailed programme regarding surveys and consents.		Slight adverse		
	Water Environment	The route will cross the floodplain of the River Ouse and its tributaries. This will require an assessment under the Water Framework Directive and the likely need for a flood risk assessment. Mitigation will be required for any loss of floodplain or barrier to flows. This is likely to involve non-standard mitigation which will need to be agreed with the Environment Agency.		Moderate adverse		
Social	Commuting and Other users	The scheme is likely to improve journey times along the route and remove queuing for key movements at major junctions, therefore providing significant benefits.	Value of journey time changes(£) Net journey time changes (£) 0 to 2min / 2 to 5min / > 5min		£330m	
	Reliability impact on Commuting and Other users	Journey time reliability has been highlighted as a key problem on the route and this scheme would likely significantly improve the consistency of journey times.		Large Beneficial		
	Physical activity	The scheme is unlikely to lead to a significant increase in the number of people walking or cycling in the area as it is a primarily highways scheme. Some existing Public rights of way and cycle paths will be impacted by the scheme; however any design is likely to include new footpaths and cycle ways mitigating the impact of these lost facilities. Therefore, it is unlikely that this scheme will lead to an increase in the number of people walking and cycling or the distance that current users travel and has been assessed as having a neutral impact on physical activity.		Neutral		
	Journey quality	The scheme is assessed as having neutral impacts on Traveller Care and Travellers' Views while also having beneficial impacts on Frustration and Fear of potential accidents. Therefore the scheme is awarded an overall score of "Beneficial".		Moderate beneficial		
	Accidents	Not assessed at this stage.				
	Security	The scheme is unlikely to have any impact on security for users at the route.		Neutral		
	Access to services	The scheme is unlikely to impact the availability and cost of public transport which will lead to an improvement or worsening of the existing ability of non-car users to access services.		Neutral		
	Affordability	The scheme is unlikely to impact the cost of travel for users.		Neutral		
	Severance	The scheme is considered to have negligible impact on the current severance situation. The option it is very unlikely to have any impact on Public rights of way and cycle paths.		Neutral		
	Option and non-use values	The scheme does not propose any changes to the existing public transport services.		Neutral		
Public Account	Cost to Broad Transport Budget	Highways England Commercial have estimated scheme cost at £1bn in 2014 prices			£354m-£707m	
	Indirect Tax Revenues	Not assessed at this stage				

A428 Black Cat to Caxton Gibbet Improvements

Stage 2+ Alternative Mode Assessment Report

Report Number: HE551495-ACM-GEN-GEN_SW_Z_ZZ-RP-TR-0004 P06 S4
August 2020

A428 Black Cat to Caxton Gibbet Improvements

Stage 2+ Alternative Mode Assessment Report

Report No: HE551495-ACM-GEN-GEN_SW_Z_ZZ-RP-TR-0004 P06
S4
August 2020

Revision	Current Status	Role	Name	Date
P01	S3 For HE SES review	Author	Andrew Young	03/01/20
		Checker	Alistair Shepherd	03/01/20
		Verifier	Mark Chadwick	03/01/20
		Approver	Tony King	03/01/20
P02	S3 For HE SES review	Author	Andrew Young	19/02/20
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		Verifier	Mark Chadwick	19/02/20
		Approver	Tony King	19/02/20
P03	S3 For HE SES review	Author	Andrew Young	30/04/20
		Checker	Alistair Shepherd	30/04/20
		Verifier	Mark Chadwick	30/04/20
		Approver	Tony King	30/04/20
P04	S3 For HE PM review	Author	Andrew Young	05/05/20
		Checker	Alistair Shepherd	05/05/20
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P05	S4 For Stage Approval	Author	Andrew Young	17/06/20
		Checker	Alistair Shepherd	23/06/20
		Verifier	Mark Chadwick	23/06/20
		Approver	Tony King	24/06/20
P06	S4 For Stage Approval	Author	Andrew Young	21/08/20
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		Verifier	Mark Chadwick	21/08/20
		Approver	Tony King	24/08/20

Highways England
Woodlands
Manton Lane
Bedford
MK41 7LW

AECOM Infrastructure & Environment
AECOM House
Horne Lane
Bedford
Bedfordshire
MK40 1TS

SCHEDULE OF REVISIONS

Revisions Issued Since Publication

Report Revision Number	Revision Date	Paragraphs amended
P01	3/1/20	
P02	15/1/20	Sections 1.1.1, 1.1.3, 1.3 and 1.5.5 – responding to Management Team comments Sections 3.2, 3.3, 3.5 and 4 responding to comments from GP
P03	29/04/20	Sections 3.2, 3.3 and 3.5 updated in accordance with GP's review
P04	04/05/20	Table References in 3.3 amended. Tables and Figures contents lists updated.
P05	24/06/20	Paragraphs 1.1.3 and 1.1.4 updated to clarify reason for report and basis on Stage 2+. Previous Sections 1.4 and 1.5 now combined into new section 1.4 with duplication removed. Paragraph 2.3.2 – source added Paragraph 2.4.3 – clarification on new bus way Paragraph 2.4.8 – source added Paragraph 2.4.12 – PCU defined in text Paragraph 3.4.1 – AADT defined Paragraph 3.5.2 – PT expanded to Public Transport Paragraph 3.5.3 – PCU definition removed
P06	24/08/20	Section 2.2 – Non Motorised Road Users (NMU) now referred to as Walkers, Cyclists and Horse Riders (WCH). Paragraphs 3.3.4, 3.3.5, 3.3.6 and 3.5.9 – the new A428 alignment now referred to as the 'new dual carriageway'

Standard codes for suitability models and documents See BS1192:2007 Table 5 for further details					
Revision	Status	Description	Revision	Status	Description
P01.01 etc. to Pnn.nn etc.	S0	Initial status or WIP	P01.1 etc. to Pnn.nn etc.	D1	Costing
P01.01 to Pnn.nn	S1	Co-ordination	P01.1 etc. to Pnn.nn etc.	D2	Tender
P01 to Pnn	S2	Information	P01.1 etc. to Pnn.nn etc.	D3	Contractor Design
P01 to Pnn	S3	Review & Comment	P01.1 etc. to Pnn.nn etc	D4	Manufacture/ Procurement
P01 to Pnn	S4	Stage Approval	C01 to Cnn	A1, A2 etc	Approved and accepted as stage complete
P01 to Pnn	S5	Manufacture	P01.01 etc. to Pnn.nn etc.	B1, B2 etc	Partially signed-off:
P01 to Pnn	S6	PIM Authorization	C01 to Cnn	CR	As Construction Record
P01 to Pnn	S7	AIM Authorization			

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1 INTRODUCTION

1.1 Background

1.1.1 AECOM was commissioned in April 2017 by Highways England under the Collaborative Delivery Framework (Consultancy) 2016-2017 Annex D, to undertake PSF Stage 3 and 4 works associated with the proposed A428 Black Cat to Caxton Gibbet Improvements Scheme. This includes the provision of transportation, environmental and other services associated with the delivery of the A428 Black Cat to Caxton Gibbet scheme through preliminary design and statutory procedures and powers. The Scheme was designated as being part of the Complex Infrastructure Programme in 2019 after previously being part of the East Regional Investment Programme (RIP), developed as part of the Government's Road Investment Strategy 1 (RIS1) 2015 to 2020. Because of its scale it is also now designated a Tier 1 scheme.

1.1.2 AECOM is updating the earlier modelling undertaken in the development of this scheme by developing a new 'Stage 3' traffic model to assist in the traffic modelling and assessment of the Scheme in association with delivery of the relevant Project Control Framework (PCF) Products through Stage Gate Assessment Review (SGAR) 3 and 4.

1.1.3 In the interim period and to inform investment decisions, it was necessary to update the model developed under Stage 2 (to form the Stage 2+ model) to improve analytical assurance which was set at Red/Amber level largely due to model convergence issues. The Stage 2+ traffic forecasts were used to support the Outline Business Case[1] and were also used in the public consultation process.

1.1.4 An assessment of alternative modes was previously undertaken by others for PCF Stage 2 in 2018[2]. As part of the Stage 2+ assessment, AECOM was tasked by Highways England to rework the Alternative Modes Assessment Report (AMAR) to reflect the updated Stage 2+ deliverables and to capture any relevant updates since the original report. This assessment has, therefore, been prepared in accordance with the published guidance for PCF Stage 2, using outputs from the Stage 2+ model.

1.2 Purpose of the Alternative Mode Assessment Report

1.2.1 The purpose of this report is to provide an assessment of alternative modal options for this scheme, based on the requirement that scheme promoters should assess other modes and sustainable transport options, as a possible alternative to the given road scheme.

1.2.2 This report considers the feasible alternative modes and follows the guidelines set out in Highways England's Traffic Appraisal Modelling and Economics (TAME) Advice Note 2 v1.0 published in July 2015. The advice note describes the requirements at Project Control Framework (PCF) Stage 2 in terms of the questions that must be answered to satisfy Highways England that all alternative modes have been examined and the proposed highway solution is the correct option.

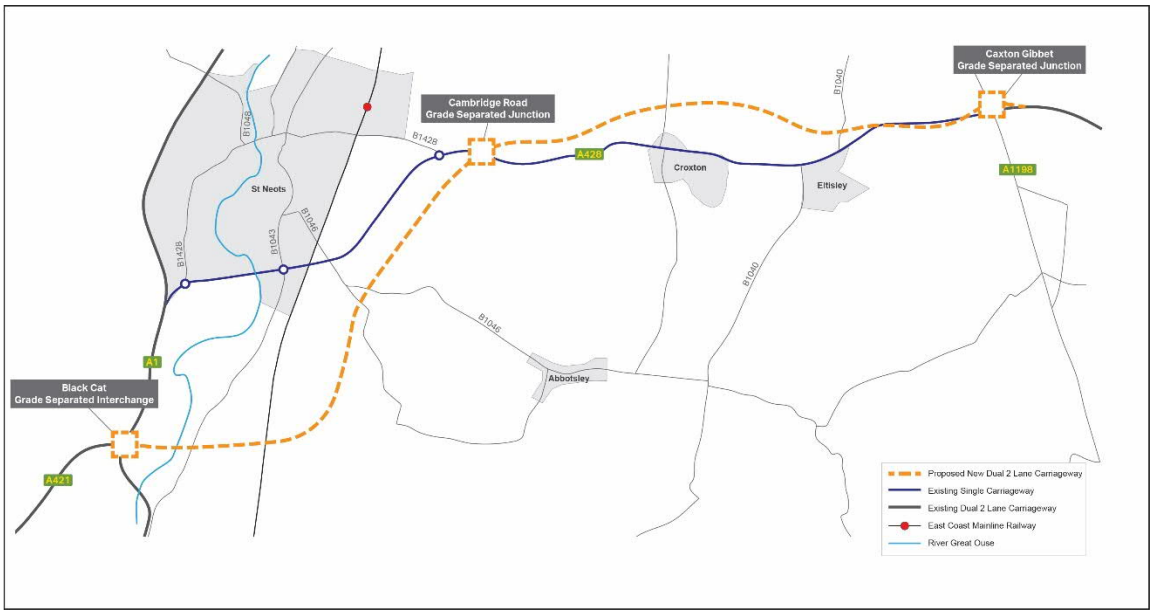
[1] As approved by DfT's Board Investment and Commercial Committee (BICC), October 2019

[2] "Assessment of Alternative Modes", Report No HE551495-JAC-XXX-XX-RP-TR-0013, 6th August 2018

1.3 Scheme Description

1.3.1 The purpose of the Scheme is to address the problems of congestion, poor journey time reliability and poor resilience against incidents between the Black Cat and Caxton Gibbet roundabouts. The Scheme seeks to address these problems through the construction of a new 10 mile dual 2-lane carriageway from west of the A421/A1 Black Cat roundabout through to east of the A428/A1198 Caxton Gibbet roundabout, shown in schematic form in Figure 1 – The Scheme below.

Figure 1 – The Scheme



1.3.2 The Scheme includes the following components:

a. A new three-level grade separated junction at Black Cat roundabout, with the A1 at the lower level, the new dual carriageway on the upper level and a roundabout between the two at approximately existing ground level. In addition to slip roads a new free flowing link between the A421 eastbound carriageway and the A1 northbound carriageway will also be provided.

b. A new grade separated all movements junction will be constructed to the east of the existing Cambridge Road roundabout to provide access to the new dual carriageway and maintain access to the existing A428.

c. At the Caxton Gibbet roundabout, a new grade separated all movements junction will be constructed, incorporating the existing roundabout on the south side of the new dual carriageway and a new roundabout on the north side. The new dual carriageway will then tie-in to the existing A428 dual carriageway to the east of the new Caxton Gibbet junction.

d. In the vicinity of the new Black Cat junction, direct access onto the A1 from some local side roads and private premises will be closed for safety reasons. A new local road will provide an alternative route. The existing Roxton Road bridge will be demolished and replaced with a new structure to the west to accommodate the realigned A421.

e. New crossings will be constructed to enable the new dual carriageway to cross the River Great Ouse, East Coast Main Line railway, Barford Road, the B1046/Potton Road, Toseland Road and the existing A428 at Eltisley.

f. The existing A428 between St Neots and Caxton Gibbet will be de-trunked and retained for local traffic and public transport with maintenance responsibility transferred to the local highway authorities.

g. An alternative access will be provided to side roads at Chawston, Wyboston and Eltisley.

h. There will be safer routes for walkers, cyclists and horse riders.

1.4 Scheme Background

1.4.1 There are other strategic highway schemes currently in various stages of planning and construction that have the potential to impact upon this Scheme and vice versa. These are:

- The A14 Huntingdon-Cambridge scheme. Construction work for the new road alignment started in November 2016, and this complete scheme is scheduled to be open in full to traffic in December 2020;
- The A1 East of England Strategic Study, which could potentially see the A1 re-aligned in the vicinity of the Scheme. This is in the early stages of scheme development and is currently not being progressed; and
- The Oxford to Cambridge Expressway, although this scheme is currently under review as part of RIS 2.

1.4.2 The A428 Black Cat to Caxton Gibbet is the only section of the Strategic Road Network (SRN)[3] that is a single carriageway between M1 J13 and the Port of Felixstowe via Cambridge and the A14.

1.4.3 The A428 was identified as experiencing significant junction capacity issues; specifically, the Felixstowe to Midlands Route Strategy highlighted the following issues:

- Severe lack of capacity (links and junctions) on the A428 between the A1 and A1198;
- Congestion and delays;
- Low traffic speed and unreliable journey times; and
- A lack of resilience to incidents on the single carriageway section of the A428 between the A1 / A421 Black Cat Roundabout and A428 / A1198 Caxton Gibbet Roundabout.

1.4.4 As well as acknowledging the points above, analysis carried out for previous stages of this project also highlighted additional existing problems experienced by those using the A428 corridor:

[3] The SRN in England is made up of motorways and trunk roads, the most significant 'A' roads. It represents around two per cent of all roads in England by length, but it carries a third of all traffic by mileage, and two thirds of all heavy goods vehicle traffic.

- Public Transport (PT) provision is inadequate with only limited bus services and no parallel rail service provision;
- Alternative east-west routes between Cambridge and other economic centres such as Milton Keynes, Northampton and Bedford are limited.
- There is poor provision for those travellers using non-motorised modes;

1.4.5 Motorists experience regular delays and congestion as the A1 and A428 cuts through rural communities and villages, and particularly at the A1 / A421 Black Cat and A428 / A1198 Caxton Gibbet roundabouts.

1.4.6 The A428 Route Strategies OAR and SOBC (AECOM, 2014)[4] identified the problems faced by the A428:

- It carries twice the volume of traffic it was designed for, with a number of junctions operating near to or at capacity;
- The route, as a whole, was identified as having safety and maintenance issues by Highways England;
- The A428 between Wyboston and Caxton Gibbet was identified by Highways England as having peak hour speeds of less than 40mph with link delays in the top 20% nationally;
- The A428 was identified by Highways England as one of the least reliable journey time sections nationally;
- Black Cat roundabout has been identified as having a safety problem (69th highest number of accidents nationally); and
- The A428 between Wyboston and Caxton was identified as being within the top 25% of highway links nationally for casualties per billion vehicle miles.

1.4.7 Economic growth on the corridor is being constrained, primarily by the above issues.

1.4.8 It is likely that the growth in population, jobs and traffic that is forecast in the area will exacerbate the above problems.

1.4.9 Specific improvements for the A428 scheme to address these problems were announced as part of the Road Investment Strategy (RIS1). Improvements would additionally complement other proposed improvements which could transform the Oxford to Cambridge corridor into a modern, high performing route, helping to facilitate ambitious growth aspirations in the Oxford - Cambridge Arc of up to 1 million new homes by 2050.

1.5 The Requirements of TAME Advice Note 2 v1.0

1.5.1 The PCF Stage 2 assessment of alternative modes consists of a simple two-level assessment. Two questions must be addressed as follows:

Level 1: "Could an alternative modal intervention solve the identified problem?"

1.5.2 In the event that the answer to this question is 'yes', a second level of test must be considered and assessed:

[4] As referred to in the Scheme's OBC.

Level 2: "Knowing the benefits of the preferred option, what impact would a modal alternative require in order to relieve the problem to the same degree and is that viable?"

1.5.3 Following discussions with Highways England it has been agreed that 'relieving the problem to the same degree' is to be interpreted in terms of the flows using the existing road network only. Specifically, the relief that the Scheme creates has been calculated as the reduction in flow on the existing road network (or equivalents) in 2038 between the Do Minimum (DM) without the A428 scheme and Do Something (DS) with the A428 scheme scenarios.

1.5.4 The implication (not explicitly stated in the TAME guidance) is that if the answer to the Level 1 question is 'no' then the Level 2 question need not be asked or answered.

2 ALTERNATIVE MODE CONSIDERATION

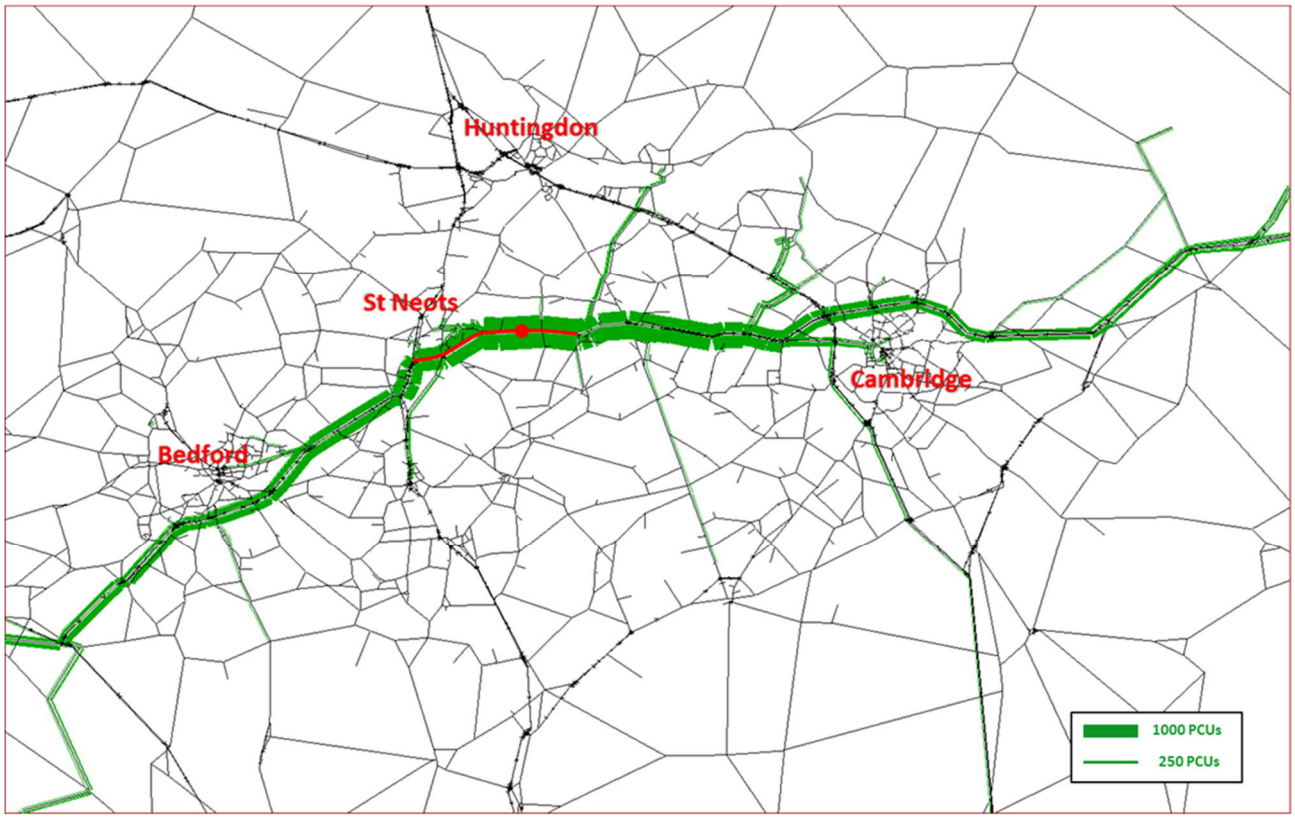
2.1 Introduction

2.1.1 This section addresses the Level 1 question – whether an alternative modal intervention could solve the identified problem – in the context of the existing transport facilities and committed transport improvements. It describes the possible contribution of alternative modes to help satisfy the future travel demands and meet the Scheme objectives.

2.2 Walkers, Cyclists and Horse Riders (WCH)

2.2.1 It has been noted above that there is currently poor provision for WCHs in the vicinity of this proposed scheme. However, one of the key issues relating to the Scheme is the high traffic demand on the current A428 route. A plot of the modelled 2016 Base Year AM Peak flows on a section of this route is shown in Figure 2.

Figure 2 – 2016 Base Year AM Peak Actual Traffic Flows on Section of A428

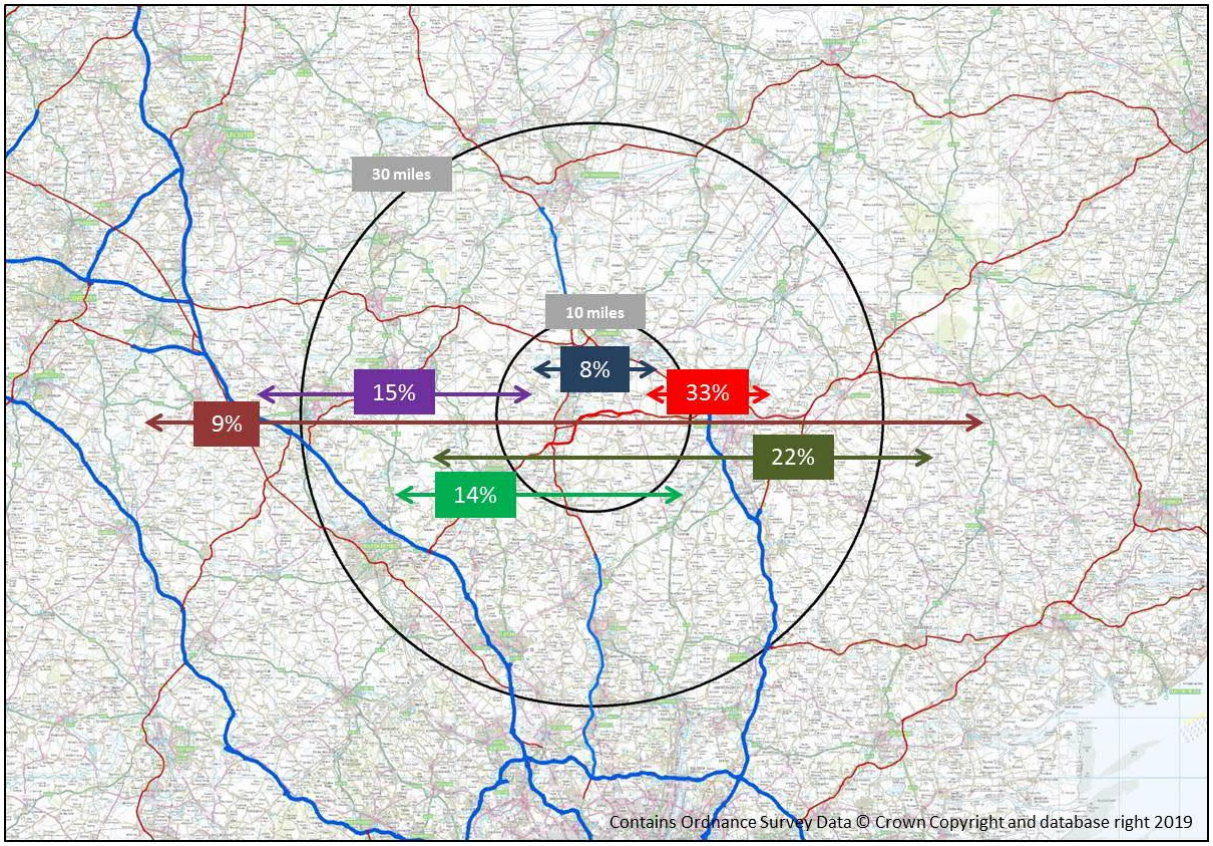


2.2.2 Table 2.1 shows the relative distribution of the origins and destinations of the two-way traffic using this link and the associated trip length distribution. These proportions are shown in Figure 3. The average trip length is approximately 75 km (45 miles).

Table 2.1 – Trip Length Distribution of Base Year Traffic on the A428

Nearest O/D	Furthest O/D	Proportion of Trips
<10 miles	<10 miles	8%
<10 miles	10-30 miles	33%
<10 miles	>30 miles	15%
10-30 miles	10-30 miles	14%
10-30 miles	>30 miles	22%
>30 miles	>30 miles	9%

Figure 3 – Diagram of Trip Lengths by Movement Category



2.2.3 It can be seen from this that a significant proportion of the demand is medium to long distance traffic. According to the latest National Travel Survey data[5] 96% of walking trips are less than two miles in length and 94% of cycling trips are less than 10 miles in length. Considering that the length of the existing A428 carriageway between the Cambridge Road and Caxton Gibbet junctions is just under 6 miles, most of the modelled trips using the A428 are longer than 10 miles in length. It is considered reasonable to assume that most road users of the A428 would not switch modes to walk or cycle. Similarly, traffic that is mainly north-south along the A1 is predominantly medium to long distance traffic, and so it is also considered that these road users would not switch mode to walk or cycle.

2.2.4 Consequently, it is considered that an WCH scheme(s) would not generate the levels of mode-switching required to solve the identified problems on the A428.

2.3 Road-based Public Transport

2.3.1 The only bus service operating on a weekday at more than one bus every hour along the A428 is the X5 operated by Stagecoach[6]. This service runs between Cambridge and Oxford via St Neots and Bedford but does not serve Cambourne. Depending on the time of day it operates at a 15 minute or a 30 minute frequency but mostly the latter.

2.3.2 The scheduled time from the Cambridge Parkside stop (within the central area of Cambridge) and the St Neots Market Square stop is 40-50 minutes. The scheduled time to Bedford Bus Station is 79-94 minutes. In the opposite direction the respective scheduled trip times are longer at 45-69 minutes and 85-104 minutes[7].

2.3.3 According to the Google Maps Journey Planner the equivalent time by car would be around 40 minutes between Cambridge and St Neots and around 60 minutes between Cambridge and Bedford. These times include consideration for congestion and delays. It would not be expected that the bus services would travel any faster than these cars. Additionally, any future increases in delays on the A428, at Black Cat or any other junctions would adversely affect car traffic and bus traffic equally.

2.3.4 There are no known regular bus or coach services operating at more than one bus per hour along the A1. Similar considerations apply to the potential for such bus and coach services to adequately mitigate the relevant traffic congestion.

2.3.5 Consequently, it is considered unlikely that any significant improvement to the frequency or capacity of this service (i.e. the X5), or the introduction of any other bus service would generate the levels of mode-switching necessary to solve the identified problems on the A428.

[5] Table NTS0308.
[6] November 2019.
[7] https://www.stagecoachbus.com/promos-and-offers/east/stagecoach-x5#

2.4 Off-Road Public Transport

2.4.1 Currently the only 'off-road' public transport service in the area is the Guided Busway between Cambridge and St Ives. With the addition of on-road sections of route this service currently runs from Huntingdon in the northwest to Trumpington in the south of Cambridge. It runs on-road between Huntingdon and St Ives as well as through Cambridge.

2.4.2 There is a long-term plan to expand this service into a fully-fledged Cambridge Autonomous Metro (CAM, sometimes labelled Cambridge Area Metro). The first additional section of this is the Cambourne to Cambridge (C2C) link.

2.4.3 In January 2020, Cambridgeshire CC published proposals for 'a new busway' (effectively C2C) linking Cambourne and Cambridge. The planned route will start on roads in Cambourne, before linking up with the developments at Bourn Airfield and a possible future new Park and Ride site at Scotland Farm. From there, it will run alongside the A428, cut through countryside to the north of Coton and cross over the M11 on a newly-constructed bridge, before ending on Adams Road and linking into the existing road network in Cambridge.

2.4.4 The scheme is designed to cut congestion along the A428 and A1303, and provide a more reliable public transport link from Cambourne into Cambridge city centre. It has been estimated that the route could substantially reduce morning peak hour journey times. As yet, it is not known what impact the scheme would have to reduce traffic flows on the A428. Further details are available via the following website link below[8].

2.4.5 Available bus patronage information for this scheme is limited. The forecast patronage[9] between Madingley Roundabout and Grange Road in 2031 is understood to be 2,300-3,700 daily trips depending on the final scheme and Park and Ride option that will be preferred.

2.4.6 Depending on the announcement of the preferred route, it is possible the whole scheme, including a Park and Ride site, would be constructed between 2022 and 2024.

2.4.7 The plans include a new Park and Ride site in the vicinity of Madingley Mulch, to remove demand from and/or replace the current Madingley Road Park and Ride site that is heavily used.

2.4.8 Cambridge CC has advised this study that if a Park and Ride site at Madingley Mulch is selected then abstraction of traffic from the A428 may be modest, the main benefit will be on the A1303[10].

[8] https://www.cambridge-news.co.uk/news/cambridge-news/cambourne-cambridge-busway-offroad-gcp-17597021

[9] Table 3: Key Transport Comparators On vs Off Road between Madingley roundabout and Grange Road, Cambridge, accessed via the following link https://scambs.moderngov.co.uk/documents/g7211/Public%20reports%20pack%20Thursday%2006-Dec-2018%2016.00%20Greater%20Cambridge%20Partnership%20Executive%20Board.pdf?T=10

[10] email from Cambridge CC to AECOM dated 12 December 2019 15:45

2.4.9 The potential future extension of the C2C route to St Neots might impact the flows on the A428 between Caxton Gibbet and St Neots. If this extension of the service runs on roads in the same way as the existing X5 bus service then the same arguments that were applied above (in paragraph 2.3.3) recur, and the new service will have limited impact upon the traffic flows on the A428, although it will provide a direct service from Cambourne to St Neots.

2.4.10 If the extension were to run along its own dedicated busway for significant sections of its length then the journey times from end-to-end would be reduced relative to the existing X5 service, as will the variation in those times. Such a service might offer sufficient benefits to attract some mode-switching from car along the A428 corridor.

2.4.11 The current plans are for six services an hour throughout the day. The bus type currently used by Stagecoach for the existing Guided Busway services has a capacity a little lower than 100 passengers/bus. Assuming similar buses for the new CAM routes this equates to a maximum capacity of nearly 600 passengers per hour in each direction between St Neots and Caxton Gibbet.

2.4.12 In the Base Year AM Peak demand plot shown above in Figure 2 the modelled demand on the relevant selected central section of the A428 is just over 1,000 passenger car units (PCUs)[11] eastbound and just over 1100 PCUs westbound. Out of these flows, the flows to/from Cambridge are just under 100 PCUs eastbound and just under 200 PCUs westbound, while flows to/from St Neots are about 200 PCUs in each direction. Of these flows very few are making a journey all the way between the centres of St Neots and Cambridge i.e. only about 25 PCUs do so in in each direction.

2.4.13 While this C2C service is likely to have a beneficial impact on some of the shorter distance trips along the A428 corridor, the evidence suggests that a significant proportion of the trips on this corridor are medium/longer distance trips, which this service would have only limited capacity to attract. It is therefore considered that C2C will not be able to solve the range of issues identified along the A428 corridor.

2.5 Passenger Rail Services

2.5.1 There are currently no rail services that parallel the A428 in the area. The existing rail lines are mainly north-south, with one line running north from Kings Cross through St Neots and Huntingdon (the East Coast Main Line, ECML), and another running north from Liverpool Street through Cambridge and Ely – there is a connecting link between these two lines between Cambridge and Stevenage via Letchworth. A third line from St Pancras runs through St Albans, Luton and Bedford.

2.5.2 The existing ECML might potentially, with suitable increases in frequency and train capacity, be able to cause some mode switching from car to rail that would assist in mitigating some of the issues at Black Cat for the movements between A1 North and A1 South. However, these would have little impact on the significant movements between A421 West to A1 North and they would not be able to mitigate the congestion issues along the A428 corridor.

11 Passenger Car Unit

2.5.3 Travel by rail between Cambridge/St Neots and Bedford is currently only viable via London or via Peterborough and Leicester. Travel by rail between Cambridge and St Neots is currently only viable via London, via Stevenage or via Peterborough.

2.6 Capacity Considerations on the East Coast Main Line

2.6.1 The following ECML related documents have been reviewed in order to establish the potential for introducing improvements to this railway line:

- Route Specifications 2018 London North Eastern and East Midlands (RS18 LNEEM, 2018);
- East Coast Main Line 2016 Capacity Review (ECMLCR, 2010);
- Route Specifications 2016 Anglia (RS16 A, 2016); and
- Route Specifications 2017 London North Western (RS17 LNW, 2017).

2.6.2 The section of ECML between Hitchin and Peterborough falls under section SRS G.01 of Route G in the RS18 LNEEM. According to the Passenger Train Service Levels table this section of line has six high speed trains per hour in the off-peak rising to eight high speed trains per hour in the peaks as well as two suburban trains per hour between King's Cross and Peterborough rising to six suburban trains per hour in the peaks.

2.6.3 There are currently no plans to increase the frequency of services.

2.6.4 The capacity review (ECMLCR) was carried out in 2010, but took consideration of what reasonable improvements to the network could be carried out in order to supply the service frequencies listed in its various scenarios.

2.6.5 For this analysis the upper limit has been assumed to be 10 high speed trains per hour across the entire day, although it is recognised that this could be lower during the peak hours.

2.6.6 The ECML has limited additional capacity for additional high-speed trains to be run on it (at all times of the day, but especially during the peak periods). The practical limit on the number of high-speed trains per hour has been taken from the above analysis as 10, and there are already eight high-speed trains per hour using the line. This effectively limits the potential for any additional high-speed services to a maximum of two trains per hour in the peaks.

2.6.7 Assuming an average train capacity of 630 passengers per high-speed train this would equate to a maximum additional capacity of 1,260 passengers per direction in the peaks.

2.6.8 Improvements to the ECML might have the potential to cause some mode-shift to rail of traffic that uses Black Cat. Some traffic on the southern arm of the A1 at Black Cat might possibly be accommodated on either the ECML or, depending on its precise routing the East West Rail scheme (see Section 2.7 below).

2.6.9 The only part of the above analysis where the modal shift could be accommodated on the ECML alone would be the northern arm of the A1 at Black Cat. It has been assumed that these movements might possibly be relieved by the provision of increased capacity on the ECML.

2.6.10 However, it is not known how these ECML improvements would be funded and hence it is considered that these would not be likely to deliver practicable or feasible alternatives that could make available the necessary relief that would otherwise be provided at Black Cat by implementing the A428 scheme.

2.7 Plan For New East West Rail Route

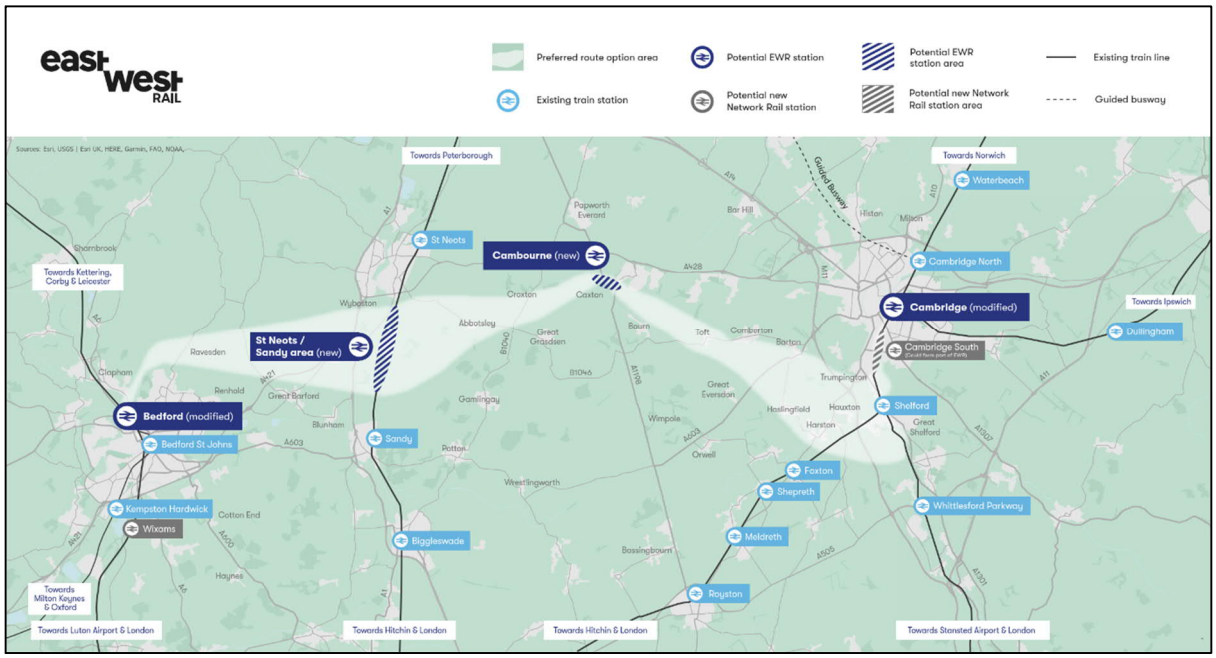
2.7.1 As part of the Oxford to Cambridge corridor improvements a new East West Rail (EWR) route is being proposed. The Central Section of this (i.e. between Cambridge and Bedford) is relevant to this assessment. This section is currently at an early stage in the planning.

2.7.2 In January 2020, the Government selected the preferred route for the final central section of the East-West Rail link between Bedford and Cambridge. Route E is the favoured option.

2.7.3 As shown in Figure 4, the route links existing stations in Bedford and Cambridge with communities in Cambourne and the area north of Sandy, south of St. Neots. This new route will see two new stations built, one between Sandy and St Neots (at Tempsford or St Neots) and one at Cambourne. A decision on funding is expected in the March 2020 budget. At the moment however, there is insufficient data available to model the preferred route. Further details are available via the website linked below.[12]

2.7.4 The Central Section rail link could open, assuming funding and consents approval, in the early 2030's.

Figure 4 – East West Rail Central Section Preferred Route



[12] https://eastwestrail.co.uk/the-project/central-section

2.7.5 This new EWR service is likely to cause some mode switching from car to rail, which would in part help to mitigate some of the congestion issues along the A428. This aspect is considered further in Section 3.6.

2.8 Rail Freight

2.8.1 A similar issue exists with regard to rail freight as passenger services in there being no direct line and services running east-west as freight services run from London via St Neots to Peterborough and from Felixstowe via Ely to Peterborough. The latter caters well for the freight demand between Felixstowe and the Midlands and the North. The line through St Neots competes with the A1 for freight movements, but there is no reason to believe that improvements to freight service provisions on this line would have a significant impact on freight movements along the A1.

2.8.2 There are currently plans to upgrade the railway lines from London via Cambridge to Peterborough to handle freight.

2.8.3 The EWR proposals will allow freight services to run between Bedford and Bicester and between Milton Keynes and London via Aylesbury. However, it is assumed likely that the freight traffic would be mainly abstracted from the existing east-west Felixstowe-Peterborough railway line, rather than road freight traffic switching both from the A428 corridor and from road to rail mode.

2.8.4 Consequently, it is considered unlikely that any rail intervention(s) would create sufficient freight mode-shift to solve the identified problems on the A428 corridor.

2.9 Other Railway Lines

2.9.1 At this stage, it is not considered that either the West Anglia Main Line or Marston Vale Line would provide practical alternatives that could provide the relief that would be provided by the A428 scheme.

2.10 Conclusion

2.10.1 It is considered that only the EWR proposals as discussed earlier in Section 2 need to be considered further in the Level 2 assessment (see Section 3).

3 ANALYSIS OF IMPACTS AND RELIEF

3.1 Introduction

3.1.1 This section addresses the Level 2 question noted above, which is repeated below as follows:

Level 2: "Knowing the benefits of the preferred option, what impact would a modal alternative require in order to relieve the problem to the same degree and is that viable?"

3.1.2 Section 1 has described the existing challenges and issues faced when travelling along the A428, and the background to the proposed improvement scheme and its objectives.

3.1.3 The following section identifies the amount of relief that EWR would need to provide to be able to relieve the existing problems on the A428 to the same degree as the proposed highways improvement scheme. This is then compared with the amount of relief it is expected to provide to the A428.

3.2 Current Traffic Volumes

3.2.1 The modelled 2016 Base Year volumes at the Black Cat roundabout are presented in Table 3.1. The evidence for the junction being heavily congested is clear – in the AM Peak all three of the (access/entry) arms have demand that is over 80% capacity[13], with both A1 arms being at least 100% of capacity. In the PM Peak the A1 NB arm is also over 100% capacity.

3.2.2 The result is large delays in some directions in some time periods. The largest of these is A1 SB in the AM Peak[14] at 118 seconds per vehicle and A1 NB in the PM Peak at 65 seconds per vehicle.

Table 3.1 – 2016 Base Year Black Cat Roundabout Performance (Flows in PCUs, Delays in secs)

	A1 SB			A1 NB			A421 EB		
	Arrival Flow	V/C at Rdbt	Av Delay	Arrival Flow	V/C at Rdbt	Av Delay	Arrival Flow	V/C at Rdbt	Av Delay
AM	2786	106	118	1304	100	26	1749	85	7
IP	2053	51	5	1084	73	20	1555	70	5
PM	2810	70	5	1142	102	65	1606	79	6

3.2.3 The modelled Base Year volumes on the A428 links between the A1 junction and Caxton Gibbet are presented in Table 3.2 and Table 3.3. The section between the A1 and the Barford Road junction is the most congested in both directions across all time periods and, in the AM and PM peaks, has Volume to Capacity (V/C) ratios of over 80% in at least one direction.

[13] As determined from the Study's SATURN highways model results
[14] All the peaks referred to in this report relate to "average peak hours".

Table 3.2 – Base Year A428 Eastbound Link Performance (Flows in PCUs)

	A1 - Barford Road		Barford Road - Cambridge Road		Cambridge Road - B1040		B1040 - Caxton Gibbet	
	Actual Flow	V/C	Actual Flow	V/C	Actual Flow	V/C	Actual Flow	V/C
AM	1351	82	785	48	1008	61	1164	71
IP	1198	73	760	46	872	53	798	49
PM	1397	85	950	58	1049	64	941	57

Table 3.3 – Base Year A428 Westbound Link Performance (Flows in PCUs)

	Caxton Gibbet - B1040		B1040 - Cambridge Road		Cambridge Road - Barford Road		Barford Road - A1	
	Actual Flow	V/C	Actual Flow	V/C	Actual Flow	V/C	Actual Flow	V/C
AM	1062	65	1103	67	903	55	1272	78
IP	840	51	860	52	718	44	1047	64
PM	1302	79	1240	76	967	59	1436	88

3.3 Traffic Forecasts

3.3.1 Modelled 2023 and 2038 volumes at the Black Cat roundabout are presented in Table 3.4 and Table 3.5 respectively. It is worth noting that in the Do-Minimum (DM) scenario all traffic arriving at the Black Cat roundabout must traverse around the roundabout. In the Do-Something (DS) scenario, however, there are through free-flow routes available for key movements. Consequently, two DS datasets are presented. The first presents the total demand and the overall average delay per vehicle (vehicles using the through free-flow routes have zero delay). The second presents the demand, V/C and delays for traffic using only the circulatory mid-level roundabout.

Table 3.4 – 2023 Black Cat Roundabout Performance (Flows in PCUs, Delays in secs)

		A1 SB			A1 NB			A421 EB			A428 WB		
		Arrival Flow	V/C at Rdbt	Av Delay	Arrival Flow	V/C at Rdbt	Av Delay	Arrival Flow	V/C at Rdbt	Av Delay	Arrival Flow	V/C at Rdbt	Av Delay
DM	AM	2786	106	118	1339	103	74	1937	95	13	na	na	na
	IP	2472	62	5	1346	90	21	1754	93	12	na	na	na
	PM	2978	74	6	1191	107	145	1717	89	9	na	na	na
DS (total)	AM	3230	na	12	1762	na	7	2092	na	1	1413	na	7
	IP	2009	na	2	1602	na	1	1885	na	0	773	na	1
	PM	2429	na	3	2051	na	2	1943	na	1	1334	na	2
DS (at Rdbt only)	AM	1794	99	21	519	85	23	276	18	4	386	80	24
	IP	978	26	4	332	26	5	306	18	3	176	15	5
	PM	1218	75	6	492	48	7	266	16	4	321	39	8

Table 3.5 – 2038 Black Cat Roundabout Performance (Flows in PCUs, Delays in secs)

		A1 SB			A1 NB			A421 EB			A428 WB		
		Arrival Flow	V/C at Rdbt	Av Delay	Arrival Flow	V/C at Rdbt	Av Delay	Arrival Flow	V/C at Rdbt	Av Delay	Arrival Flow	V/C at Rdbt	Av Delay
DM	AM	2786	106	118	1411	108	174	2057	102	55	na	na	na
	IP	2881	72	6	1492	100	27	1830	102	65	na	na	na
	PM	3179	79	6	1229	110	207	1848	94	12	na	na	na
DS (total)	AM	3263	na	29	2091	na	10	2350	na	1	1724	na	8
	IP	2386	na	2	1781	na	2	2242	na	1	1053	na	1
	PM	2709	na	13	2291	na	3	2084	na	1	1617	na	3
DS (at Rdbt only)	AM	1719	102	55	622	95	35	363	24	4	470	90	31
	IP	1200	30	4	475	46	7	407	24	4	234	25	6
	PM	1415	98	24	575	72	12	338	22	4	352	56	12

3.3.2 In the DM, with the notable exception of the A1 SB in the AM Peak which appears to be delay-constrained, the flows at all three arms increase between 2023 and 2038 in all time periods. The delays consequently increase as well, with all arms suffering delays of over 1 minute per vehicle in at least one time period by 2038.

3.3.3 In the DS the flows at the A1 NB and A421 EB arms increase relative to the DM in all time periods, although the delays go down (both at the re-designed roundabout and over all movements). The A1 SB flow in the DM is split in the DS between the A1 SB and A428 WB – taking this into consideration the overall flows in the DS also increase relative to the DM for this arm. In general, the delays also decrease, but there are exceptions. In 2038 PM the average delay across both relevant arms increases from six seconds per vehicle to nine seconds per vehicle, with the roundabout traffic delay increasing to 24 seconds per vehicle on the A1 SB and 12 seconds per vehicle on the A428 WB. This is a consequence of the new roundabout design (i.e. with only a two-lane access to the give way) providing a reduced roundabout capacity on that arm in the DS relative to the DM.

3.3.4 Modelled 2023 and 2038 volumes on the A428 (existing and new dual carriageway) are presented in Table 3.6 to Table 3.9. For the DM scenario the data has been presented for the same set of links as were presented for the Base Year (in Table 3.2 and Table 3.3). For the DS scenario the flows along the new dual carriageway have been presented as well. Note that to obtain equivalent traffic volumes, the flows associated with sections of the existing A428 would need to be added to the flows on the parallel section of the new dual carriageway.

Table 3.6 – 2023 A428 Eastbound Link Performance (Flows in PCUs)

		A1 - Barford Road		Barford Road - Cambridge Road		Cambridge Road - B1040		B1040 - Caxton Gibbet		A1 - Cambridge Road		Cambridge Road - Caxton Gibbet	
		Actual Flow	V/C	Actual Flow	V/C	Actual Flow	V/C	Actual Flow	V/C	Actual Flow	V/C	Actual Flow	V/C
DM	AM	1402	86	782	48	1010	62	1037	63	na	na	na	na
	IP	1339	82	905	55	1017	62	944	58	na	na	na	na
	PM	1526	93	1049	64	1150	70	1028	63	na	na	na	na
DS	AM	1066	65	364	22	272	17	423	44	1026	17	1385	26
	IP	991	60	496	30	142	9	36	3	791	20	1301	33
	PM	1382	84	540	33	198	12	53	6	1150	29	1671	42

Table 3.7 – 2023 A428 Westbound Link Performance (Flows in PCUs)

		Caxton Gibbet - B1040		B1040 - Cambridge Road		Cambridge Road - Barford Road		Barford Road - A1		Caxton Gibbet - Cambridge Road		Cambridge Road - A1	
		Actual Flow	V/C	Actual Flow	V/C	Actual Flow	V/C	Actual Flow	V/C	Actual Flow	V/C	Actual Flow	V/C
DM	AM	1179	72	1231	75	1013	62	1362	83	na	na	na	na
	IP	1007	61	1020	62	877	53	1267	77	na	na	na	na
	PM	1391	85	1306	80	1028	63	1522	93	na	na	na	na
DS	AM	35	2	133	8	280	17	1146	70	1935	48	1413	35
	IP	54	3	128	8	493	30	905	55	1352	34	773	19
	PM	124	8	155	9	562	34	1143	70	2249	56	1334	33

Table 3.8 – 2038 A428 Eastbound Link Performance (Flows in PCUs)

		A1 - Barford Road		Barford Road - Cambridge Road		Cambridge Road - B1040		B1040 - Caxton Gibbet		A1 - Cambridge Road		Cambridge Road - Caxton Gibbet	
		Actual Flow	V/C	Actual Flow	V/C	Actual Flow	V/C	Actual Flow	V/C	Actual Flow	V/C	Actual Flow	V/C
DM	AM	1569	96	899	55	1155	70	1036	63	na	na	na	na
	IP	1461	89	1008	61	1124	69	1035	63	na	na	na	na
	PM	1597	97	1101	67	1185	83	1019	62	na	na	na	na
DS	AM	1227	75	459	28	325	20	587	64	1233	31	1704	43
	IP	1179	72	657	40	212	13	54	6	1095	27	1753	44
	PM	1464	89	608	37	216	13	100	13	1354	34	1963	49

Table 3.9 – 2038 A428 Westbound Link Performance (Flows in PCUs)

		Caxton Gibbet - B1040		B1040 - Cambridge Road		Cambridge Road - Barford Road		Barford Road - A1		Caxton Gibbet - Cambridge Road		Cambridge Road - A1	
		Actual Flow	V/C	Actual Flow	V/C	Actual Flow	V/C	Actual Flow	V/C	Actual Flow	V/C	Actual Flow	V/C
DM	AM	1269	77	1306	80	1104	67	1527	93	na	na	na	na
	IP	1221	74	1200	73	1051	64	1453	89	na	na	na	na
	PM	1443	88	1353	83	1133	69	1640	100	na	na	na	na
DS	AM	47	3	172	10	357	22	1234	75	2348	59	1724	43
	IP	86	5	163	10	662	40	1107	67	1832	46	1053	26
	PM	195	12	180	11	724	44	1337	82	2718	68	1617	40

3.3.5 For all sections of the existing A428 the flows reduce in the DS as traffic diverts to the new dual carriageway. This is especially the case between the Cambridge Road junction and the Caxton Gibbet junction. Flows between the A1 and the Barford Road junction are more resilient with only a small reduction in flows on the existing A428.

3.3.6 Between the Cambridge Road junction and the Caxton Gibbet junction the flows in the DS scenario on the new dual carriageway are greater than the flows on the equivalent sections of the existing A428 in the DM scenario. This is not always the case between the A1 and the Cambridge Road junction, but the sum of the flows on the parallel sections of the existing A428 and new dual carriageway in the DS always exceeds the flow in the DM on the relevant section of the existing A428.

3.4 Forecast AADTs on the A428 Corridor

3.4.1 The Stage 2+ model's 2038 forecast annual average daily traffic (AADT) flows on the A428, at the location shown in Figure 2 between Cambridge Road and the B1040 (in the DM and DS networks) and the equivalent section of the new alignment (DS only) are as follows:

- DM: 27,000 vehicles; and
- DS: 5,000 vehicles on the existing alignment; 46,000 vehicles on the new alignment; 51,000 total vehicles on the A428 corridor.

3.5 Amount of Relief Required

3.5.1 In order to satisfy the requirements of the Level 2 test an alternative mode scheme must be capable of providing the same level of relief as the proposed highway scheme. "*Relieving the problem to the same degree*" has been interpreted in terms of the flows on the existing road network only. Specifically, the relief that the scheme creates has been calculated as the reduction in flow on the existing road network between the DM and DS scenarios, in 2038.

3.5.2 Comparison between the DS and DM flow volumes shows that there is a significant level of underlying demand that does not use the Black Cat roundabout and/or the A428 in the Base Year/DM due to the high levels of congestion and delays present. Much of this demand will be from traffic that instead of using the A428 re-routes to longer alternative routes to avoid the congestion and delays. There may also be a small portion that might switch to Public Transport modes in response to the congestion, or is suppressed demand. It has been agreed with Highways England that for the purposes of this assessment any such reassignment of these flows should be ignored.

3.5.3 The traffic flows used in the assessments presented in this report have been extracted from the Stage 2+ model, in PCUs. For the purposes of applying these to determine if passenger rail could viably alleviate the issues to the same degree as the A428 scheme, these needed to be translated into units of person trips. For this purpose, data in the WebTAG Databook from May 2019 has been be used, this states that the average car in the AM Peak contains 1.43 people, in the Interpeak 1.55 people and in the PM Peak 1.48 people. Since only passenger rail is being considered at this stage an assumption has been made that the transfer will only apply to car drivers/passengers (i.e. not LGVs or HGVs). Consequently, in this instance PCUs have been considered as being equivalent to cars.

Black Cat Roundabout Relief Requirements

3.5.4 The Black Cat Roundabout will be completely rebuilt as a result of the Scheme, as a result of which there is no existing road network in the DS to which flows in the DM can be directly compared. For this purpose, the roundabout in the Scheme junction design has been taken as being equivalent to the existing roundabout. The amount of relief provided by the Scheme has been calculated by subtracting the flows entering the roundabout in the 2038 DS scenario from the flows entering the roundabout in the 2038 DM scenario.

3.5.5 For the A1 NB arm in the AM Peak the flows entering the roundabout in 2038 DM are 1,411 PCUs, while the flows in 2038 DS are 622 PCUs. The relief requirement is about 790 PCUs or 1,130 person trips during the AM Peak hour.

3.5.6 For the A1 NB arm in the PM Peak the flows entering the roundabout in 2038 DM are 1,229 PCUs, while the flows in 2038 DS are 575 PCUs. The relief requirement is about 650 PCUs or 970 person trips during the PM Peak hour.

3.5.7 For the A1 SB arm in the AM Peak the flows entering the roundabout in 2038 DM are 2,786 PCUs. The flows in 2038 DS for the A1 SB in the AM Peak are 1,719 PCUs. There is a further complication unique to the analysis of this arm – in the DM network traffic from the east (e.g. Cambridge) would access Black Cat via the A428 and then the A1 SB, whereas in the DS network this traffic will access Black Cat via the A428 WB directly. Consequently, the flows for the A428 WB in 2038 DS need to be included for the total 2038 DS flows to measure the equivalent traffic volumes to those already measured in 2038 DM. These flows are 470 PCUs. The relief requirement is about 600 PCUs or 800 person trips during the AM Peak hour.

3.5.8 For the A1 SB arm in the PM Peak the flows entering the roundabout in 2038 DM are 3,189 PCUs. The flows in 2038 DS for the A1 SB in the PM Peak are 1,415 PCUs. Adopting the same approach as above, the flows for the A428 WB in 2038 DS need to be included. These flows are 352 PCUs. The overall relief requirement is about 1,420 PCUs or 2,110 person trips during the PM Peak hour.

A428 Corridor Relief Requirements

3.5.9 For the A428 corridor the Scheme creates a new dual carriageway that is 'parallel' to the existing A428 between Caxton Gibbet and the A1. Since the agreed mechanism to determine the required relief involves only changes in flows on the existing road network, the flows on the new dual carriageway have not been taken into account here. The relief requirement has been calculated by subtracting the flows on the relevant section of the existing A428 alignment in the 2038 DS from those in 2038 DM.

3.5.10 Table 3.10 and Table 3.11 respectively show the relief requirements for the A428 corridor, in 2038, for the eastbound and westbound directions.

Table 3.10 – Eastbound Relief Requirements on the A428 Corridor (2038)

		A1 - Barford Road	Barford Road - Cambridge Road	Cambridge Road - B1040	B1040 - Caxton Gibbet
AM	DM	1,569	899	1,155	1,036
	DS	1,227	459	325	587
	Relief - PCU	342	440	830	449
	Relief - Persons	489	629	1,187	642
IP	DM	1,461	1,008	1,124	1,035
	DS	1,179	657	212	54
	Relief - PCU	282	351	912	981
	Relief - Persons	437	544	1,414	1,521
PM	DM	1,597	1,101	1,185	1,019
	DS	1,464	608	216	100
	Relief - PCU	133	493	969	919
	Relief - Persons	197	730	1,434	1,360

Table 3.11 – Westbound Relief Requirements on the A428 Corridor (2038)

		A1 - Barford Road	Barford Road - Cambridge Road	Cambridge Road - B1040	B1040 - Caxton Gibbet
AM	DM	1,527	1,104	1,306	1,269
	DS	1,234	357	172	47
	Relief - PCU	293	747	1,134	1,222
	Relief - Persons	419	1,068	1,622	1,747
IP	DM	1,453	1,051	1,200	1,221
	DS	1,107	662	163	86
	Relief - PCU	346	389	1,037	1,135
	Relief - Persons	536	603	1,607	1,759
PM	DM	1,640	1,133	1,353	1,443
	DS	1,337	724	180	195
	Relief - PCU	303	409	1,173	1,248
	Relief - Persons	448	605	1,736	1,847

3.5.11 Table 3.10 shows that in 2038 the peak eastbound relief requirement on the A428 corridor would be for some 980 PCU and 1,520 person trips in the Interpeak (between the B1040 and Caxton Gibbet); followed by 970 PCU/1,430 person trips in the PM peak (between Cambridge Road and the B1040).

3.5.12 Table 3.11 shows that in 2038 the peak Westbound relief requirement on the A428 corridor (between the B1040 and Caxton Gibbet) would be for some 1,250 PCU/ 1,850 person trips in the PM peak.

Summary of the Key Relief Requirements

3.5.13 At Black Cat in 2038 the maximum required flow reductions that would need to be provided by EWR would be:

- A1 SB arm (i.e. southbound/westbound traffic): 600 PCUs, equivalent to 800 person trips in the AM Peak hour; and
- A1 SB arm (i.e. southbound/westbound traffic): 1,420 PCUs, equivalent to 2,110 person trips in the PM Peak hour.

3.5.14 Along the A428 corridor in 2038 the required maximum flow reductions that would need to be provided by the EWR scheme would be:

- Eastbound, 980 PCUs equivalent to 1,520 person trips in the Interpeak (between the B1040 and Caxton Gibbet); followed by 970 PCUs equivalent to 1,430 person trips in the PM peak (between Cambridge Road and the B1040); and
- Westbound, between the B1040 and Caxton Gibbet: 1,250 PCUs equivalent to 1,850 person trips in the PM peak.

3.6 Forecasts of Future Flows on EWR

3.6.1 East West Rail Limited have provided Highways England (in confidence) with forecast information about the numbers of trips forecast to use their scheme, including:

- Annual station to station journeys;
- Trip growth factors to 2040; and
- Trips diverting from highways mode to EWR services.

3.6.2 This study has carried out a high-level manual assignment of these trips to determine the numbers that might be attracted off the A428 onto EWR services in 2040. Based on this, it has been determined that there could be a transfer of between 900-1,500 car trips per day from the A428 corridor onto EWR as shown in Table 3.12.

Table 3.12 – Forecast Numbers of Daily Car Trips Diverted from A428 to East West Rail (2040)

Diverted Car trips (2 way)	Bedford - Tempsford/St Neots	Tempsford/St Neots - Cambourne	Cambourne - Cambridge
Per day	900	1,000	1,500

3.6.3 This daily transfer is small compared to the AADT numbers of vehicles forecast to use the A428 (i.e. 29,000 between Black Cat and Cambridge Road; and 46,000 between Cambridge Road and Caxton Gibbet) and, although it would reduce the future flows on the road improvement scheme, it will not remove the need for it.

3.6.4 Assuming an average occupancy per vehicle of between 1.43 – 1.55, this could provide a relief to the A428 corridor in the order of approximately 1,300 - 2,300 person trips per day.

3.6.5 Further, allowing for some concentration of rail trips in the peak hours, and assuming that about 30% of the daily flow will take place in both the AM and PM peak hours on the highways network, this would represent a forecast peak hour switch of car user trips away from the A428 to EWR, in the order of only 390 – 690 person trips per hour (2-ways).

3.6.6 These 2-way daily person trip forecasts are much smaller than the peak one-way hourly person trip relief requirements identified above.

3.7 Summary of this Assessment

3.7.1 Based on the Level 2 analysis presented above, EWR will not cause substantial amounts of trips to switch mode from road (car) to rail, and as a result will not relieve the A428's problems to the same degree as will the proposed highways Scheme.

4 OVERALL CONCLUSIONS

4.1 Assessment Requirements

4.1.1 The PCF Stage 2 assessment of alternative modes consists of a simple two-level assessment. Two questions must be addressed as follows:

Level 1: "Could an alternative modal intervention solve the identified problem?"

4.1.2 In the event that the answer to this question is 'yes', a second level of test must be considered and assessed:

Level 2: "Knowing the benefits of the preferred option, what impact would a modal alternative require in order to relieve the problem to the same degree and is that viable?"

4.2 Conclusions

4.2.1 Following consideration of the range of alternative modes and schemes, the only scheme that may be able to provide a solution to the problem for which the A428 Black Cat to Caxton Gibbet scheme has been proposed is the East West Rail proposal.

4.2.2 The A428 highway scheme solves and provides relief to the identified delay problems at the Black Cat roundabout and to the congestion issues on the A428 carriageway between the A1 and Caxton Gibbet.

4.2.3 At Black Cat in 2038 the maximum required flow reductions that would need to be provided by EWR would be:

- A1 SB arm (i.e. southbound/westbound traffic): 600 PCUs, equivalent to 800 person trips in the AM Peak hour; and
- A1 SB arm (i.e. southbound/westbound traffic): 1,420 PCUs, equivalent to 2,110 person trips in the PM Peak hour.

4.2.4 Along the A428 corridor in 2038 the required maximum flow reductions that would need to be provided by the EWR scheme would be:

- Eastbound, 980 PCUs equivalent to 1,520 person trips in the Interpeak (between the B1040 and Caxton Gibbet); followed by 970 PCUs equivalent to 1,430 person trips in the PM peak (between Cambridge Road and the B1040); and
- Westbound, between the B1040 and Caxton Gibbet: 1,250 PCUs equivalent to 1,850 person trips in the PM peak.

4.2.5 The EWR has been forecast above as likely to divert only 390-690 person trips (2 way) away from the A428 in the AM and PM peak hours. This is considerably less than the level of relief required.

4.2.6 Based on the analysis presented above, EWR will therefore not cause substantial amounts of trips to switch mode from road (car) to rail, and as a result will not relieve the identified problems at Black Cat and on the A428 corridor to the same degree as will the proposed highways scheme.

A428 Black Cat to Caxton Gibbet

Highways England

Assessment of Alternative Modes

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A428 Black Cat to Caxton Gibbet

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Jacobs U.K. Limited

1 City Walk
Leeds, West Yorkshire LS11 9DX
United Kingdom
T +44 (0)113 242 6771
F +44 (0)113 389 1389
www.jacobs.com

Contents

1. Introduction

1.1 Purpose of report

This report provides an assessment of alternative modal options for the A428 Black Cat to Caxton Gibbet scheme based on the requirement that scheme promoters should assess other modes and sustainable transport options.

In July 2015 Highways England's Traffic Appraisal Modelling and Economics (TAME) released an advice note detailing the requirements of the Networks – National Policy Statement (NN NPS) where scheme promoters must demonstrate consideration and assessment of alternative options for intervention, including examining options using different modes of transport (from here on referred to as TAME Advice Note).

TAME now advise that this should be done at two stages in the PCF process, PCF Stage 0 and PCF Stage 2.

The previous assessment was provided in the PCF Stage 1 Appraisal Specification Report[1] (ASR) and this report provides the assessment required to answer the following questions at PCF Stage 2 (Option Selection):

1. Could an alternative modal intervention solve the identified problem?

2. Knowing the benefits of the preferred option, what impact would a modal alternative require in order to relieve the problem the same degree and is that viable?

This report will make use of analysis undertaken at PCF Stage 0 where problems and issues on the route were investigated in detail (as presented in the Options Assessment Report[2]), analysis undertaken in the first response to the TAME Advice Note included in the Stage 1 ASR and new analysis using our current understanding of the scheme's impacts in the A428 SATURN Model.

1.2 Scheme background

Jacobs has been commissioned by Highways England to progress the A428 Black Cat to Caxton Gibbet improvement scheme through Stage 2 of the Project Control Framework (PCF). The scheme was announced in the Autumn Statement 2014 Roads Investment Strategy (RIS) along with a large number of other major roads schemes. Jacobs have previously been commissioned to progress a number of RIS schemes in the East of England through PCF Stage 0 (Strategy, shaping and prioritisation) including the A428 Black Cat to Caxton Gibbet improvements and have taken the A428 Black Cat to Caxton Gibbet Scheme through PCF Stage 1.

This report details the findings of the economic appraisal of the A428 Black Cat to Caxton Gibbet Scheme, which proposes to form a new expressway standard link between Black Cat roundabout and Caxton Gibbet roundabout and to upgrade these junctions to allow the A428/A421 to flow freely.

It presents monetised costs and benefits of the scheme, and describes the methodologies used to derive these impacts. The monetised impacts presented in this report are used to inform the overall Value for Money assessment of the scheme.

1.3 Structure of Report

The remainder of the report is structured as follows:

2. Identification of Problems

3. Consideration of Alternative Mode Options

4. Required Impact of an Alternative Mode Solution

5. Summary and Conclusions

[1] A428 Black Cat to Caxton Gibbet Appraisal Specification Report (Jacobs, 2016)
[2] A428 Black Cat to Caxton Gibbet Option Assessment Report (Jacobs, 2016)

2. Identification of Problems

2.1 Current Situation

2.1.1 Land Use and Demographics

The A428 corridor provides a strategic link between the A421, A1, A14 and M11, linking Cambridge with Bedford via smaller towns including St Neots and Camborne.

Cambridge is located at the eastern end of the A428 and to the east of the M11. Cambridge has become the heart of high-technology industries for software and bioscience companies. Cambridge science and business parks are located to the north-east of the town. Smaller industrial areas are present across the town, including Clifton Road Industrial Estate near Cambridge rail station.

Bedford is located to the west of the A428 further along the A421. The major employment and industrial land use is broadly located in the near vicinity of the A421, including Elm Farm and Woburn Road Industrial Estates.

St Neots is one of the largest and fastest growing towns in Cambridgeshire with a population of 31,165 in 2011. It has undergone two major expansion schemes in the last 10 years including 1,250 new homes at Love's Farm. The town is bounded to the west by the A1 and predominantly to the south by the A428. The major employment site is adjacent to the Wyboston junction in the south-west of the town.

Cambourne is a new settlement on the A428, 9 miles east of Cambridge. It is the largest settlement in South Cambridgeshire and is home to South Cambridgeshire District Council and Camborne Business Park.

Car ownership in the area (76% households have access to at least one car) is marginally higher than the national average (74%) but is below the average for the East of England (81%).

As shown in **Table 2.1**, there are a higher proportion of residents in employment in the study area compared with the east of England region and England as a whole. A total of 45% of working age residents in the study area travel to work in a car (either as a driver or passenger) while 7% commute using public transport. The statistics for the east of England region are very similar to those for the study area. The corresponding proportions for England as a whole are 40% traveling by car and 11% using public transport.

Table 2.1 : Method of travel to work

Mode of travel	Study Area	East of England	England
All public transport	7%	8%	11%
Work from home	3%	4%	3%
Taxi/motorcycle/other	1%	1%	1%
Driving a car or van	41%	41%	37%
Passenger in a car or van	4%	3%	3%
Bicycle	4%	2%	2%
On foot	8%	7%	7%
Not in employment	32%	33%	35%

This shows that the area is heavily dependent on the private car and subsequently the highway network while Public Transport has a lower than average uptake.

2.1.2 Transport Network

Highway Network

As mentioned previously the A428 links the A1, A421, M11 and A14 and provides a key east-west corridor. The A428 between Wyboston Interchange and Caxton Gibbet is the only remaining section of single carriageway between Cambridge and Milton Keynes on this east-west corridor and there is a long term ambition to achieve an expressway between Oxford and Cambridge, of which the A428 is a part.

There are a number of junctions along the route and three large at grade junctions, Black Cat roundabout, Caxton Gibbet Roundabout and Wyboston Interchange (although Wyboston interchange is grade separated for A1 traffic).

The A1 connects London with Edinburgh and is the main link between the south and the north through the study area.

Outside of these strategic roads owned and maintained by Highways England there is an extensive network of local roads operated by local bodies that are used for rat running when the strategic routes are delayed and suffer from congestion because of this

Public Transport Network

St Neots Railway Station is located on the East Coast Main Line (ECML) and provides rail services between London Kings Cross and Peterborough every 30 minutes. Journey times are between 53 and 69 minutes to London Kings Cross and 25 minutes to Peterborough. No east west rail services currently operate in the study area.

There are limited bus services operating along the A428. The X5 service operated by Stagecoach runs between Cambridge and Oxford via St Neots, Bedford and Milton Keynes. It operates every 30 minutes during the middle of the day, and up to every 15 minutes during the morning and evening peaks.

Two National Express services also operate along the A428 at a frequency of once per day: the 305 service between Liverpool and Clacton-on-Sea and the 314 service between Southport and Cambridge. Both of these services stop at Bedford, St Neots, Cambourne and Cambridge.

Non-Motorised Users

The A428 / A1 study area provides some facilities for non-motorised users. These include various footways, crossing facilities and underpasses. Part of the Sustrans national cycle network (NCN) route 12 runs on Roxton Road parallel to the section of A1 between Black Cat and Wyboston.

Route Based Strategy evidence reports identified that the Black Cat, Wyboston and Caxton Gibbet roundabouts, and the A428 link between Wyboston and Caxton Gibbet have issues regarding cycling and pedestrian provision. Stakeholders highlighted the poor NMU provision between the Phoenix Park Triangle and the Eaton Socon urban area.

2.1.3 Route Performance

Traffic Volumes

Analysis of commuting patterns across the study area using 2011 Census data shows that the largest commuting movements in the area are between St Neots and Cambridge and between St Neots and Bedford. These two movements are those most likely to use the A1 and A428 between Black Cat and Caxton Gibbet.

This leads to high traffic volumes along the route, a detailed data collection exercise was undertaken in April and May 2016, as detailed in the Traffic Data Collection Report[3] (TDCR), showed that the volume on single

[3] A428 Black Cta to Caxton Gibbet Traffic Data Collection Report (Jacobs, 2016)

carriageway sections of the A428 can be as over 1,300 vehicles per hour in the peak periods as shown in **Table 2.2** and **Table 2.3**.

Table 2.2 : Northbound/Eastbound Traffic Flows between Black Cat and Caxton Gibbet

Site ID	Site Location	Direction	AM Peak (veh)	IP (veh)	PM Peak (veh)
TRADS – 8/9017	A1 between Black Cat and Wyboston Interchange	NB	2,316	1,967	2,683
ATC-128	A428 between Wyboston and Barford Road	EB	1,186	1,007	1,364
ATC-129	A428 between Barford Road and Cambridge Road	EB	608	637	829
ATC-130	A428 between Cambridge Road and Croxton	EB	875	754	987
ATC-131	A428 between Croxton and Eltisely	EB	900	749	974
ATC-132	A428 between B1040 junctions	EB	988	793	1,018
ATC-133	A428 between St Ives road and Caxton Gibbet	EB	1,021	687	828

Table 2.3 : Southbound/Westbound Traffic Flows between Black Cat and Caxton Gibbet

Site ID	Site Location	Direction	AM Peak (veh)	IP (veh)	PM Peak (veh)
TRADS – 8/9017	A1 between Black Cat and Wyboston Interchange	SB	2,193	1,743	2,312
ATC-128	A428 between Wyboston and Barford Road	WB	1,173	1,016	1,332
ATC-129	A428 between Barford Road and Cambridge Road	WB	719	630	836
ATC-130	A428 between Cambridge Road and Croxton	WB	985	766	1,159
ATC-131	A428 between Croxton and Eltisely	WB	972	759	1,204
ATC-132	A428 between B1040 junctions	WB	1,020	805	1,291
ATC-133	A428 between St Ives road and Caxton Gibbet	WB	914	751	1,216

At PCF stage 0 an initial assessment of link capacity along the route was undertaken using available data sources, following the additional data collection undertaken in PCF Stage 1 this has been updated using these new observed traffic flows to get a more accurate representation of the current conditions on the road as presented in Table 2.4

Table 2.4 : A428 Link Capacity

Section	Peak hour Volume		DMRB ref. Capacity (Veh/hr)	V/C Ratio	
	AM	PM		AM	PM
Eastbound					
A1 – Black Cat roundabout to Wyboston Interchange	2,316	2,683	3,700	0.63	0.73
A428 – Wyboston Interchange to Barford Road roundabout	1,186	1,364	1,200	0.99	1.14
A428 – Barford Road roundabout to Cambridge Road roundabout	608	829	1,200	0.51	0.69
A428 – Cambridge Road roundabout to B1040 / St Ives Rd junction	900	1,018	1,200	0.75	0.85
A428 – B1040 / St Ives Rd junction to Caxton Gibbet roundabout	1,021	828	1,200	0.85	0.69
Westbound					
A428 - Caxton Gibbet roundabout to B1040 / St Ives Rd junction	914	1216	1,200	0.76	1.01
A428 - B1040 / St Ives Rd junction to Cambridge Road roundabout	1020	1291	1,200	0.85	1.08
A428 – Cambridge Road roundabout to Barford Road roundabout	719	836	1,200	0.60	0.70
A428 – Barford Road roundabout to Wyboston Interchange	1,172	1,332	1,200	0.98	1.11

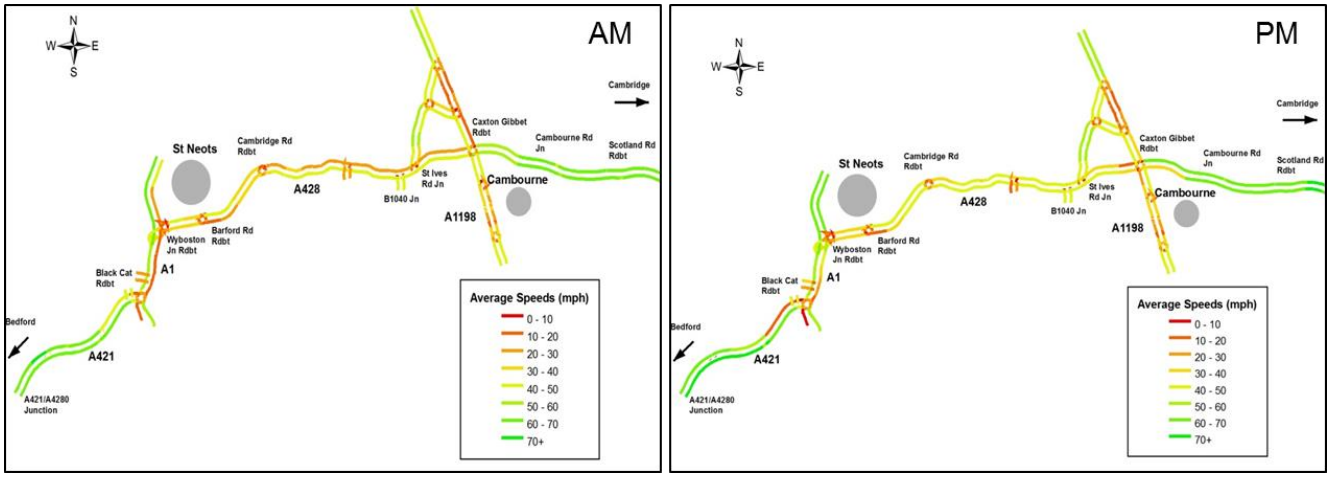
Section	Peak hour Volume		DMRB ref. Capacity (Veh/hr)	V/C Ratio	
	AM	PM		AM	PM
A1 – Wyboston Interchange to Black Cat roundabout	2,193	2,312	3,700	0.59	0.62

Several sections of the route are seen to overcapacity (V/C ratio over 1) with the PM having 3 sections of the route being over capacity in the westbound direction. When a link approaches or exceeds its capacity it leads to flow breakdown and delay.

Traffic Speeds and Journey Time Reliability

TrafficMaster Data has been used to analyse speeds on the route as shown in **Figure 2.1.**

Figure 2.1 : Observed Speeds from TrafficMaster



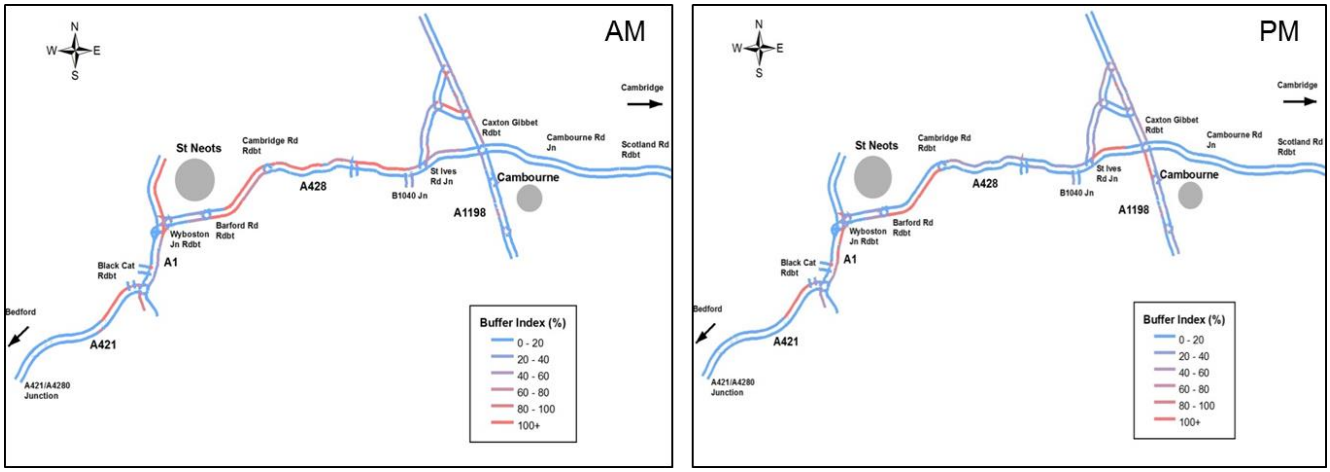
This shows that the average speeds on the single carriageway sections of the route are significantly lower than on the dual carriageway sections of the A428 and A421. A key point is that the low speeds are experienced on sections that do not exceed capacity (as shown above) and are more prevalent in the AM peak despite the PM peak showing more sections with high V/C ratios. The delay causing these slow speeds is seen to tail back from the major junctions on the route, suggesting that the junctions are a major cause of congestion related delay.

To represent Journey Time Reliability a Buffer Index (BI) has been used. The BI represents the time a traveller should allow in addition to the average travel time to ensure on time arrival 95% of the time. For example a BI of 50% means that for a trip that takes on average 10 minutes, a traveller should allow an extra 5 minutes in travel time to ensure on time arrival.

The BI for each road segment has been calculated using TrafficMaster journey time data where we have the journey time on each link of the Integrated Transport Network (ITN) for every 15 minute period in a year.

Peak period travel time reliability is illustrated in **Figure 2.2**. The reliability analysis shows that peak period travel along the A428 is relatively unreliable, with a significant number of segments having a BI of above 40%. Journey times are more unreliable in the eastbound direction in the morning, and in the westbound direction approaching Black Cat roundabout in the PM. This is likely to be due to commuters travelling to and from Cambridge during peak periods.

Figure 2.2 : Observed Buffer Index on A428 (Journey Time Reliability)



Accidents

Collision data from January 2010 to December 2014 was reviewed and evaluated to determine current safety problems along the study corridor that would help inform potential improvement options.

Data for the A1 indicates that there were 57 accidents (seven serious, 50 slight), and for the A428 100 accidents (three fatal, 20 serious, 77 slight) were recorded.

An analysis of the collision data has identified two notable collision clusters located at A1/A421 Black Cat roundabout and at Caxton Gibbet roundabout.

A review of the KSI/hmvm statistics for the A428 during the 5 year period shows it is marginally higher than the national average. This is skewed through a large number of KSIs occurring in 2010 compared to the rest of the assessment period with the observed KSI rates in 2011, 2012, 2013 and 2014 being below the national average.

The casualty rates for the A1 for the period are significantly higher than the national averages with the exception of 2012 possibly explained by a collision cluster site (A1/A421 Black Cat Roundabout).

Public Transport

As mentioned previously there is no parallel rail route as an alternative to the A428 between St Neots and Cambridge or Bedford. However, there are bus services along the A428, of which the X5 bus service operated by Stagecoach offers the only realistic commuting option. Year 2011 census data shows that only 7% of commuters in the study area commute via bus compared to 11% nationally.

A comparison of travel time and availability of bus services along the corridor versus commuting by car has been undertaken to understand how appealing east-west public transport is to the general public.

Table 2.5 : Commuting to Cambridge Parkside via bus services vs road (AM peak)

Town	Peak hour service frequency to Cambridge (buses per hour)	Scheduled travel time to Cambridge Parkside (minutes)	Estimated Journey time by car in the AM peak (minutes)
Bedford	2	74	45-100
St Neots	2	43	40-75

Table 2.6 : Commuting to Cambridge Parkside via bus services vs road (PM peak)

Town	Peak hour service frequency to Cambridge (buses per hour)	Scheduled travel time to Cambridge Parkside (minutes)	Estimated Journey time by car in the PM peak (minutes)
Bedford	2	74	45-90
St Neots	2	43	30-45

Bus services become a more preferable choice for commuting when journey times are quicker than commuting by car. However, in this case the estimated journey time by car is comparable to the scheduled journey time by bus in both the AM and PM periods. Therefore commuting by bus does not offer a significant advantage over commuting by private car.

Table 2.7 and **Table 2.8** show the comparison for commuters heading to Bedford from destinations to the east.

Table 2.7 : Commuting to Bedford via bus services vs road (AM peak)

Town	Peak hour service frequency to Bedford (buses per hour)	Scheduled travel time to Bedford (minutes)	Estimated Journey time by car in the AM peak (minutes)
St Neots	2	44	24-40
Cambridge	3	69	50-75

Table 2.8 : Commuting to Bedford via bus services vs road (PM peak)

Town	Peak hour service frequency to Bedford (buses per hour)	Scheduled travel time to Bedford (minutes)	Estimated Journey time by car in the PM peak (minutes)
St Neots	2	36	24-40
Cambridge	3	69	50-85

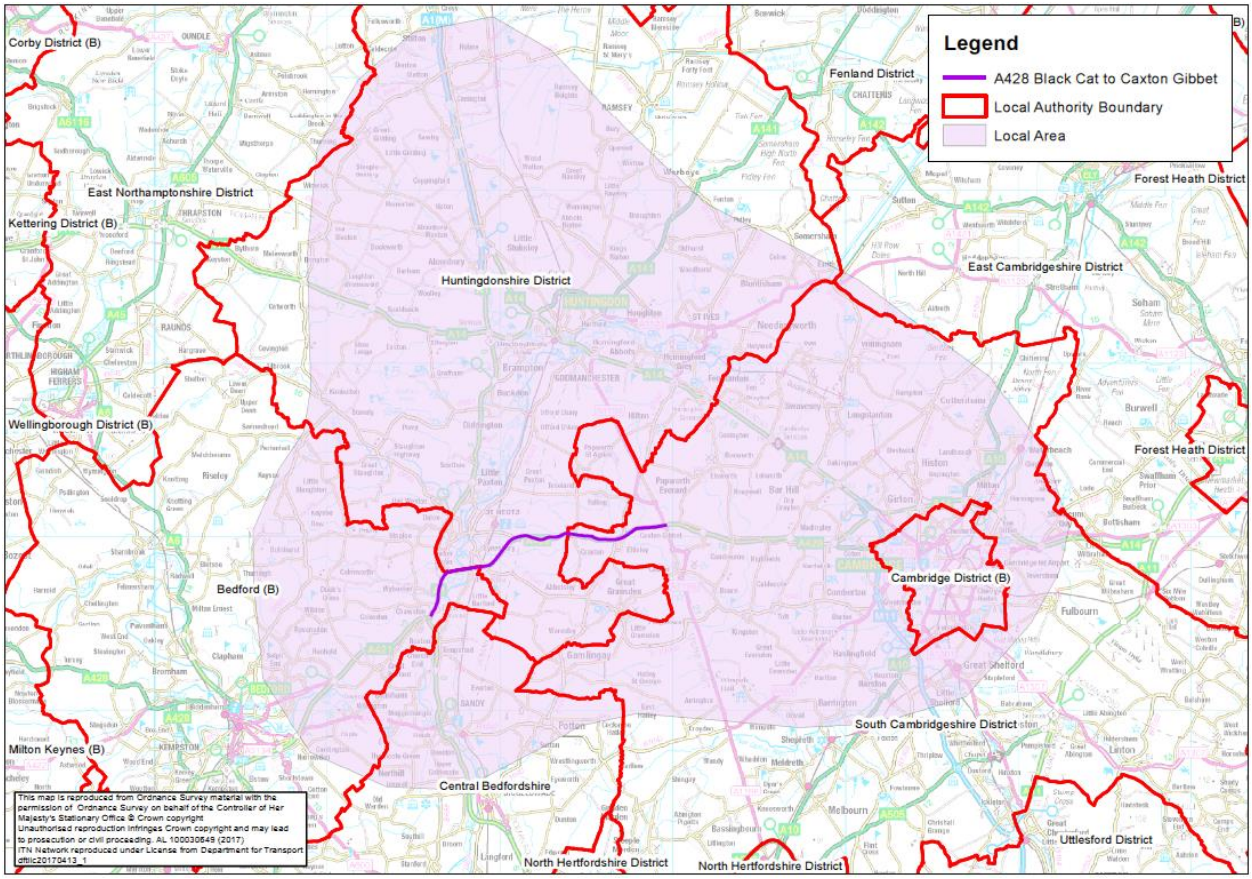
It is apparent that in that case as well journey times are ranged in similar levels between bus services and car for both AM and PM peak hours. Therefore, public transport does not appear to offer significant journey time savings over commuting by car.

2.2 Future Situation

2.2.1 Forecast Growth

The Uncertainty Log for the scheme has been developed with information from Local Authorities in the vicinity of the scheme to identify large developments in the “Local Area”. The Local Area has been defined as the area enclosed within 10km of a triangle formed by the A1 (as far south as Black Cat roundabout), A14 and A428 as shown in **Figure 2.3**.

Figure 2.3 : A428 Local Area



Requests were made to each Local Authority (LA) to obtain development information within the Local Area in two tranches:

- Within a boundary 2km outside of the triangle formed by the A14, A428 and A1 (as far south as Black Cat Roundabout:
  - Employment sites greater than 1000m^2 Gross Floor Area (GFA) or 1ha in size
  - Residential sites with more than 10 dwellings or 0.5ha in size
- Within the full Local Area (10km boundary):
  - Employment sites greater than 3ha in size
  - Residential sites with more 200 proposed dwellings

The request also asked the LAs to categorise each development in line with the definitions of uncertainty in WebTAG Unit M4 (Near Certain, More than Likely, Reasonably Foreseeable, Hypothetical) to provide an indication of how likely developments were to be progressed. Further information can be found in the scheme's Traffic Forecasting Report[4] (TFR)

A summary of the information contained in the Uncertainty Log is provided in **Table 2.9**,

[4] A428 Black Cat to Caxton Gibbet Traffic Forecasting Report (Jacobs, 2017)

Table 2.9 : A428 Uncertainty Log Development

Local Authority	Near Certain / More than Likely		Reasonably Foreseeable / Hypothetical	
	Houses	Jobs	Houses	Jobs
Bedford Borough Council	0	481	0	0
Central Bedfordshire	0	2,510	0	1,151
Cambridge City Council	6,887	15,528	1,760	9,856
Huntingdonshire District Council	13,790	16,147	8,526	4,567
South Cambridgeshire District Council	30,170	17,164	0	1,212

This growth in housing and jobs across the local area will lead to significantly increase demand upon the transport network.

In addition, the DfT's Road Traffic Forecasts 2015 (RTF15) suggest that LGV growth in the East of England is expected to increase by 86% from 2016 levels by 2051 and by 51% for HGVs in their Core Scenario.

2.2.2 Planned Infrastructure

A number of improvements to the Highway and Public Transport networks are planned in the coming years.

6 Highways improvements have been identified that should have the greatest impact on the transport network in the vicinity of the scheme, these are:

- Woodside Connection
- Luton Northern Bypass
- M1 Junction widening 10-13
- A5-M1 Link (Dunstable Northern Bypass)
- A14 Cambridge to Huntingdon
- A10 Foxton Crossing

In addition there are a number of feasibility studies being undertaken by Highways England which could result in improvements to their Strategic Road Network (SRN), notably on the A1 and the Oxford-Cambridge corridor.

A number of public transport and non-motorised user improvements are also scheduled, including:

- Croxley Rail Link (Metropolitan Line extension)
- Luton-Dunstable Busway
- East-West Rail and the Marston Vale Line
- Thames Link Programme
- Wixams Rail Station
- Cambridge Science Park Rail Station
- Soham Station
- Chisholm trail cycle route Cambridge

East-West rail is likely to have a significant impact on traffic in the vicinity of the scheme, however, the section that runs parallel to the A428 route is unconfirmed and is yet to receive funding. Should this section of the line be built providing a rail link between Oxford, Milton Keynes and Cambridge (with a potential stop at Sandy) then it is expected that some roads traffic would move to use rail.

2.2.3 Future Route Performance

Traffic Volumes

The A428 SATURN model has forecast years of 2023 (proposed scheme opening), 2038 (design year) and 2051 (final forecast year). Flows have been extracted from these forecast models for the same sections of the route as shown in **Table 2.4** for each forecast year. The same capacity analysis has been carried out as shown in Section 2.1.3 and is presented by year in **Table 2.10** to **Table 2.12**.

Table 2.10 : 2023 Capacity Assessment

Section	Peak hour Volume		DMRB ref. Capacity (Veh/hr)	V/C Ratio	
	AM	PM		AM	PM
Eastbound					
A1 – Black Cat roundabout to Wyboston Interchange	2,885	2,813	3,700	0.78	0.76
A428 – Wyboston Interchange to Barford Road roundabout	1,325	1,674	1,200	1.10	1.39
A428 – Barford Road roundabout to Cambridge Road roundabout	673	990	1,200	0.56	0.82
A428 – Cambridge Road roundabout to B1040 / St Ives Rd junction	967	1,088	1,200	0.81	0.91
A428 – B1040 / St Ives Rd junction to Caxton Gibbet roundabout	993	1,012	1,200	0.83	0.84
Westbound					
A428 - Caxton Gibbet roundabout to B1040 / St Ives Rd junction	1,139	1,437	1,200	0.95	1.20
A428 - B1040 / St Ives Rd junction to Cambridge Road roundabout	1,276	1,441	1,200	1.06	1.20
A428 – Cambridge Road roundabout to Barford Road roundabout	932	1,053	1,200	0.78	0.88
A428 – Barford Road roundabout to Wyboston Interchange	1,391	1,602	1,200	1.16	1.33
A1 – Wyboston Interchange to Black Cat roundabout	2,822	2,725	3,700	0.76	0.74

Table 2.11 : 2038 Capacity Assessment

Section	Peak hour Volume		DMRB ref. Capacity (Veh/hr)	V/C Ratio	
	AM	PM		AM	PM
Eastbound					
A1 – Black Cat roundabout to Wyboston Interchange	3,065	3,017	3,700	0.83	0.82
A428 – Wyboston Interchange to Barford Road roundabout	1,611	1,765	1,200	1.34	1.47
A428 – Barford Road roundabout to Cambridge Road roundabout	798	1,095	1,200	0.66	0.91
A428 – Cambridge Road roundabout to B1040 / St Ives Rd junction	1,079	1,164	1,200	0.90	0.97
A428 – B1040 / St Ives Rd junction to Caxton Gibbet roundabout	961	1,085	1,200	0.80	0.90
Westbound					
A428 - Caxton Gibbet roundabout to B1040 / St Ives Rd junction	1,171	1,605	1,200	0.98	1.34
A428 - B1040 / St Ives Rd junction to Cambridge Road roundabout	1,425	1,619	1,200	1.19	1.35
A428 – Cambridge Road roundabout to Barford Road roundabout	1,018	1,129	1,200	0.85	0.94
A428 – Barford Road roundabout to Wyboston Interchange	1,551	1,749	1,200	1.29	1.46
A1 – Wyboston Interchange to Black Cat roundabout	2,985	3,032	3,700	0.81	0.82

Table 2.12 : 2051 Capacity Assessment

Section	Peak hour Volume		DMRB ref. Capacity (Veh/hr)	V/C Ratio	
	AM	PM		AM	PM
Eastbound					
A1 – Black Cat roundabout to Wyboston Interchange	3,133	3,167	3,700	0.85	0.86
A428 – Wyboston Interchange to Barford Road roundabout	1,734	1,804	1,200	1.44	1.50
A428 – Barford Road roundabout to Cambridge Road roundabout	853	1,156	1,200	0.71	0.96
A428 – Cambridge Road roundabout to B1040 / St Ives Rd junction	1,132	1,217	1,200	0.94	1.01
A428 – B1040 / St Ives Rd junction to Caxton Gibbet roundabout	991	1,145	1,200	0.83	0.95
Westbound					
A428 - Caxton Gibbet roundabout to B1040 / St Ives Rd junction	1,226	1,674	1,200	1.02	1.39
A428 - B1040 / St Ives Rd junction to Cambridge Road roundabout	1,514	1,678	1,200	1.26	1.40
A428 – Cambridge Road roundabout to Barford Road roundabout	1,037	1,175	1,200	0.86	0.98
A428 – Barford Road roundabout to Wyboston Interchange	1,620	1,814	1,200	1.35	1.51
A1 – Wyboston Interchange to Black Cat roundabout	3,180	3,229	3,700	0.86	0.87

It is clear that as demand on the road network increases the capacity constraints of the single carriageway A428 will become more and more of an issue with more frequent flow break down, congestion and queuing.

Journey Times

The A428 SATURN model allows us to see how speeds and journey times are expected to change in the future given the increased demand on the network.

Journey times for a route using the A421, A1 and A428 between Bedford and Cambridge passing through the key junctions on the route (as shown in **Figure 2.4**) have been extracted from the model for the AM and PM periods in each modelled year and are presented in X.X.

Figure 2.4 : A421/A1/A428 Route

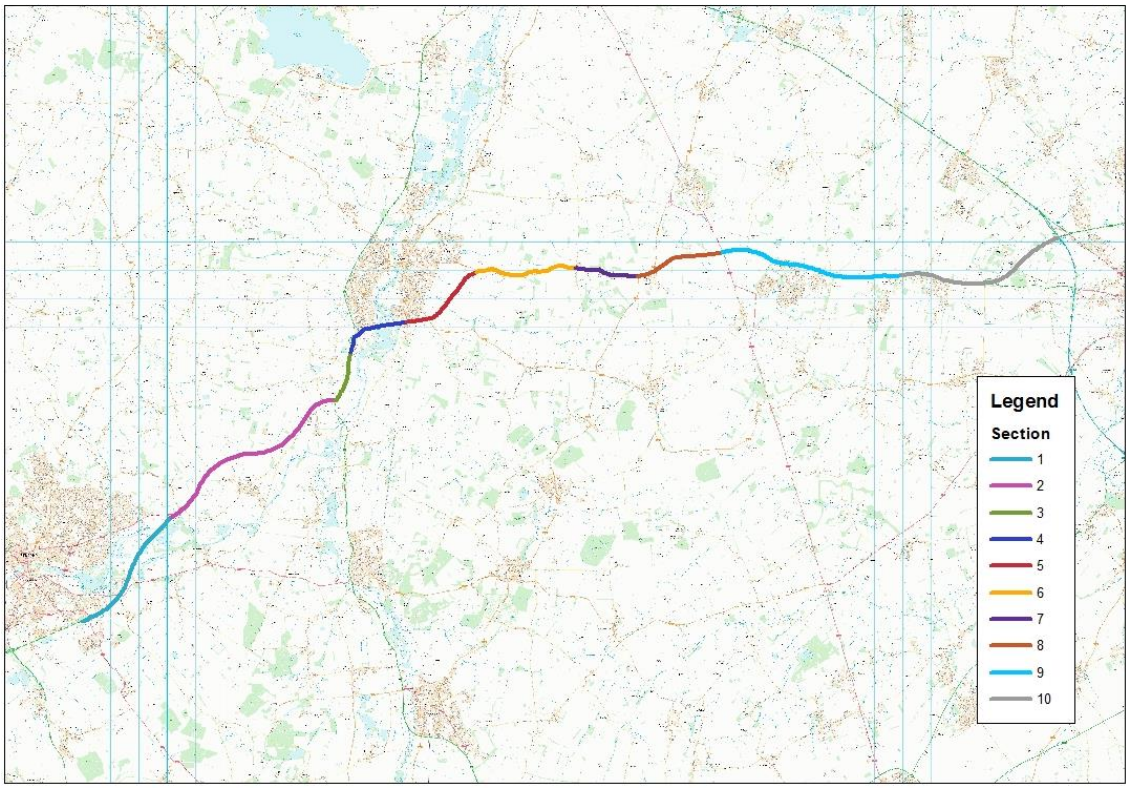


Table 2.13 : A428 Forecast Journey Times

Route	2023		2038		2051	
	AM (s)	PM (s)	AM (s)	PM (s)	AM (s)	PM (s)
A421/ A428 EB	2,261	2,188	2,495	2,349	2,644	2,515
A421/ A428 WB	2,321	2,226	2,425	2,444	2,600	2,512

From these results we can see that journey times will increase on this route as the level of traffic grows (by approximately 6 minutes in the AM between 2023 and 2051, and approximately 5 minutes in the PM), however, SATURN does not provide a direct representation of the impact on journey time reliability and instead presents an average time.

With traffic volumes exceeding capacity at links and junctions the network will experience flow breakdown and increased variability given much worsened journey time reliability than experienced now.

Safety

As traffic volumes increase the likelihood of accidents also increases, as such it is probable that without action the current number of accidents on the route will increase.

Public Transport

Network Rail undertook a series “Market Studies” in 2013 that looked at rail performance and growth in a number of areas in consultation with industry partners and a number of stakeholders. The studies identify the strategic goals for the respective market over the 30 year 2013-2043 period, forecast the levels of demand that may need to be accommodated, and formulate conditional outputs that would be needed in order to meet those strategic goals.

The ECML which services St Neots is contained with the London and South East England Market Study (Network Rail, 2013) area. The study forecasts that total numbers of peak hour travellers on the ECML are set to increase by between 36% and 106% between 2013 and 2043.

The National Travel Survey shows that the number of trips by bus has been falling over the past 20 years; however, the decline has slowed in the last five years.

2.3 Need for intervention

As evidenced in the previous sections the section of the A1 and A428 between Black Cat roundabout and Caxton Gibbet roundabout comprises a mixture of single and dual carriageway sections with a relatively large number of low-capacity at-grade junctions. The section of the A428 between Wyboston Junction and Caxton Gibbet roundabout is the only remaining single carriageway section.

The single carriageway section of the A428 has been identified as being unreliable, and Highways England has identified the A1 between Wyboston and Black Cat roundabout as being one of the least reliable journey time sections in the whole country.

The journey times between Black Cat roundabout and Caxton Gibbet roundabout are significantly longer in the peak time periods than in the off-peak period. This is as a consequence of road links and intermediate junctions reaching capacity and resulting in delays along the route including at the key junctions of Caxton Gibbet, Barford Road roundabout and Wyboston junction.

Significant traffic growth is predicted, leading to a significant increase in traffic up to 2051 (the core scenario shows 29%, 38% and 30% growth in total traffic from the base year matrices for the AM, IP and PM respectively).

The forecast increase in flow along the corridor will exacerbate the current problems experienced. **Table 2.14** provides a summary of the future problems expected on the route.

Table 2.14 : Route Problems

Problem		Level of risk
1	Lack of public transport alternatives	
2	Lack of alternative routes to the A428	
3	Poor NMU provision along the route	
4	A number of junctions within a short distance of each other are operating at close to, or beyond, their maximum capacities	
5	Average speeds on the single carriageway section of the A428 are significantly lower than the dual carriageway sections on either side	
6	AM & PM peak hour traffic speeds are significantly lower than the rest of the day	
7	Unreliable journey times along the whole route between Black Cat roundabout and Caxton Gibbet roundabout	
8	Collisions and other incidents quickly lead to delays as the single carriageway offers low resilience against lane closures	
9	A lack of driver information along the A428	
10	Future economic growth potentially constrained by lack of transport provision	
	Problem Likely to be alleviated in the future (assuming currently proposed highway / land use development) Problem unlikely to change in the future (assuming currently proposed highway / land use development) Problem likely to be exacerbated in the future (assuming currently proposed highway / land use development)	

2.4 Scheme Objectives

Following on from the identification of problems and issues a set of scheme specific objectives have been developed that are linked to Highways England's "Strategic Outcomes" as outlined in the Highways England 2015-2020 Delivery Plan as shown in **Table 2.15**.

Table 2.15 : A428 Scheme Objectives

Highways England Strategic Outcome	A428 Scheme Specific Objective
Supporting Economic Growth	a) Scheme supports planned economic and housing growth in Bedford, Cambridge and the surrounding sub-region
	b) Scheme supports spatial and strategic transport policies including Local Plans for Bedford, Cambridge and the surrounding sub-region by reducing congestion related delay, improve journey time reliability and increase the overall transport capacity
	c) Scheme promotes use of the strategic route by strategic traffic, and local routes by local traffic
A Safe and Serviceable Network	a) Scheme improves road user safety at the A421 / A1 Black Cat junction and on the A428 corridor between Wyboston and Caxton.
	b) Scheme improves road worker safety
A More Free Flowing Network	a) Provide significant capacity improvements to the Black Cat junction where the A1 currently meets the A421
	b) To create an Expressway standard link between the A421 and the existing dual carriageway section of the A428 to Cambridge
	c) Scheme increases the resilience of the transport network to cope with incidents including collisions, breakdowns, maintenance and extreme weather
An Improved Environment	a) Improve the environmental impact of transport on communities along the existing A428 corridor
	b) Reduce the impact of new infrastructure on the natural and built environment
A More Accessible and Integrated Network	a) Scheme provides a safe alternative NMU route between communities and seeks to address severance
	b) Improve safety and access for public transport users
Customer Satisfaction	a) Reduce traffic congestion delays and improve journey time reliability
	b) Improve driver information

3. Consideration of Alternative Mode Options

3.1 Introduction

The TAME advice note states that question “Could an alternative modal intervention solve the identified problem?” should be answered and this section of the report aims to answer this question.

3.2 Alternative modes considered

During PCF Stage 0 a large Option Generation exercise was undertaken (as detailed in the OAR), this identified 50 distinct options, of which 5 were public transport improvements and 2 were improvements to the NM network:

- D1 – Reinstate East-West Rail Link
- D2 – Park and Ride at St Neots
- D3 – Tram service alternative
- D4 – Bus service improvements
- D5 – Guided busway extension
- E1 – Segregated cycle lanes
- E2 – Improved pedestrian walkways

Each of these options was assessed using Jacob’s “Initial Sifting Tool”, this tool allows for scoring of each option again each problem identified for the route and each of Highways England’s objectives separately and to undertake an early assessment of feasibility and deliverability before using the DfT’s Early Appraisal and Sifting Tool (EAST), which only provides one score for impact on problems and objectives respectively.

At PCF Stage 0 the scheme was assessed against the problems and objectives as shown in **Table 3.1**.

Table 3.1 : Initial Sift Scoring Objectives

Problems			Objectives	
1	There are inadequate public transport options along the corridor; which has only limited bus services and no parallel rail service provision		1	Making the network safer
2	There is a lack of viable alternative east-west routes between Cambridge and other economic centres such as Milton Keynes, Northampton and Bedford		2	User satisfaction
3	There is poor non-motorised user provision along the corridor		3	Supporting the smooth flow of traffic
4	A number of junctions along the corridor operate close to, or at capacity;		4	Encouraging economic growth
5	Peak hour speeds along the corridor are significantly lower than the rest of the day		5	Delivering better environmental outcomes
6	Speeds on the single carriageway sections of the corridor are significantly lower than those that are dualled		6	Helping cyclists, walkers and other vulnerable users of the Network
7	There is a high degree of journey time variability along the corridor, making it difficult for users to plan their journey with confidence		7	Achieving real efficiency
8	There is low resilience against accidents and incidents on the single carriageway sections of the corridor		8	Keeping the network in good condition
9	There is a lack of driver information along the corridor			
10	The above problems also constrain economic growth along the corridor			

Each option was scored against each problem and objective on a +2 to -2 scale, giving each option a maximum score of 20 and 16 for problem and objectives respectively.

An option was considered to have a “moderate” impact on scheme problems if its scores totalled 8 or greater while to have a “moderate” fit with scheme objectives it was required to have total of 5 or greater. Options not considered having a “moderate” score for both problems and objectives were not taken forward for further assessment.

Options were also scored on a 3 category scale for deliverability and feasibility as shown in **Table 3.2**.

Table 3.2 : Deliverability/Feasibility Criteria

	Deliverability	Feasibility
1	Likely to be deliverable	Likely to be feasible
2	Likely to be deliverable (with Challenges)	Likely to be feasible (with Challenges)
3	Unlikely to be deliverable	Unlikely to be feasible

Options were required to score a 2 or better in both to be progressed for assessment using EAST.

Scoring was undertaken by experts in Highways Design, Transport Planning, Environmental Impacts, Safety, Planning and Construction. The results of the assessments for alternative mode solutions are provided below.

Figure 3.1 : Alternative Mode Scoring – Initial Sift

Reference (Route Section-Intervention)	Option Description	Problems (EAST Scale of Impact)											Objectives (EAST Fit with Other Objectives)									Deliverability	Feasibility
		1	2	3	4	5	6	7	8	9	10	Total	1	2	3	4	5	6	7	8	Total		
D - Public Transport Options																							
1	Reinstate East - West Rail Link	2	1	0	0	1	0	1	0	0	2	7	1	1	1	2	1	0	0	0	6	Likely to be deliverable (with Challenges)	Likely to be feasibile (with Challenges)
2	Park & Ride @ St. Neots	1	0	0	0	0	0	0	0	0	1	2	0	0	0	1	1	0	0	0	2	Likely to be deliverable (with Challenges)	Likely to be feasibile
3	Tram services	2	0	0	1	1	0	0	0	0	1	5	0	1	0	1	1	0	0	0	3	Likely to be deliverable (with Challenges)	Likely to be feasibile (with Challenges)
4	Bus service improvements	2	0	0	1	1	0	0	0	0	1	5	1	1	0	1	1	0	0	0	4	Likely to be deliverable	Likely to be feasibile
5	Guided bus way extension	2	1	0	0	1	0	1	0	0	2	7	1	1	1	2	1	0	0	0	6	Likely to be deliverable	Likely to be feasibile
E - NMU Options																							
1	Segregated Cycle lanes	0	0	2	0	0	0	0	0	0	0	2	1	1	0	0	0	2	0	0	4	Likely to be deliverable (with Challenges)	Likely to be feasibile (with Challenges)
2	Improved pedestrian walkways	0	0	2	0	0	0	0	0	0	0	2	1	1	0	0	1	2	0	1	6	Likely to be deliverable (with Challenges)	Likely to be feasibile (with Challenges)

Given the above scoring none of these options were taken forward at PCF Stage 0. At PCF Stage 2 with an updated understanding of current and future impacts from an extensive data collection exercise and production of a forecast SATURN Model the scores above are still considered valid.

3.3 Response to TAME Advice Note Question 1

The TAME advice note provides question 1 as:

Could an alternative modal intervention solve the identified problem?

In answer, it is not believed that an alternative mode solution can contribute to solving the problems experienced on the A428 between Black Cat and Caxton Gibbet Roundabouts.

It is believed that a larger scale rail alternative to east-west road travel would alleviate some of the problems on the route through encouraging modal shift. However, a number of issues are not dependent on the traffic demand on the route and it is not considered realistic that a modal shift sufficient to reduce congestion and delay entirely is possible given the low public transport usage currently and the fact that the proposed East-West route does not tie into St Neots, a key attractor/generator of traffic in the area.

4. Required Impact of an Alternative Mode solution

4.1 Introduction

The second question that the TAME Advice note required to be answered is:

Knowing the benefits of the preferred option, what impact would a modal alternative require in order to relieve the problem the same degree and is that viable?

To investigate and answer this question the impact of the DS scheme will be investigated to suggest how much modal shift would be required to have the same impact on the existing route.

4.2 Impact of the proposed Highways Scheme

4.2.1 Proposed Options

At this stage we do not have a preferred option for the scheme and the proposals being assessed are summarised in **Table 2.1** below

Table 4.1 : A428 Proposed Interventions

Option	Details
Black Cat Options	
Option A	Dumbbell roundabout interchange with the A421A428 and A1 free flow through the junction. Also provides free flow links for the following movements: • A421 EB to A1 NB • A1 SB to A421 WB This option is shown in Error! Reference source not found.
Option B	Two level, limited movement solution. This option allows for the following free flow movements: • A421-A428 in both directions • A421 EB to A1 NB • A1 SB to A421 WB • A428 WB to A1 SB • A1 SB through the junction However, the following movements cannot be made at the junction: • A1 NB to A428 EB • A1 SB to A428 EB • A428 WB to A1 NB This option is shown in Error! Reference source not found.
Option C	Three level interchange with the A1 and A428/A421 flowing over/under a large gyratory servicing all movements. This option also provides a free flow link for the A421 EB to A1 NB movement. This option is shown in Error! Reference source not found.
Option C Plus	Three level interchange with the A1 and A428/A421 flowing over/under the existing roundabout which is to be enlarged, servicing all movements. The A1 would become a continuous free-flow road under the enlarged Black Cat roundabout. This option also provides a free flow link for the A421 EB to A1 NB movement. This option is shown in Error! Reference source not found..

Option	Details
Route Alignment Options (see Error! Reference source not found.)	
Option 1/Orange Route	Route heads east from Black Cat Roundabout then North to tie in to the existing A428 near St Neots at Cambridge Road roundabout before continuing on the northern side of the existing A428 and tying into Caxton Gibbet Roundabout with a new grade separated dumbbell arrangement
Option 5/Pink Route	Route heads east from Black Cat Roundabout and stays north of the village of Abbotsley before heading north and tying into Caxton Gibbet Roundabout with a new grade separated dumbbell arrangement
Option 6/Purple Route	Route heads east from Black Cat Roundabout and stays south of the village of Abbotsley before heading north and tying into Caxton Gibbet Roundabout with a new grade separated dumbbell arrangement

Each of the junction options is being considered both as a discrete intervention and in combination with the route options. To prevent unnecessary work Route options 5 and 6 have ultimately only been tested with the junction option that was considered best performing when modelled with Route Option 1, as shown in **Table 4.2**.

Table 4.2 : A428 Options

Option Name	Route Option	Black Cat Junction Option
DSA	No Route Improvement	Option A
DSB	No Route Improvement	Option B
DSC	No Route Improvement	Option C
DSC_P	No Route Improvement	Option C Plus
DS1_A	Option 1 / Orange Route	Option A
DS1_B		Option B
DS1_C		Option C
DS1_CP		Option C Plus
DS5_ CP	Option 5 / Pink Route	Best of A, B, C and CP from Orange
DS6_ CP	Option 6 / Purple Route	Best of A, B, C and CP from Orange

For the purposes of this report only those impacts associated with a combined route and junction improvement have been considered. Each of these options is likely to have significant impact on traffic conditions in the wider area both in terms of traffic volumes and journey times.

4.2.2 Impact on Journey Times

Journey times have been extracted from SATURN for Do Something scenario and have compared to those in the Do Minimum for each time period in the modelled years of 2023, 2038 and 2051.

4 journey time routes have been considered and the results of the journey time impacts for 2023 AM are presented in Table 4.3:

1. Bedford to Cambridge
2. Cambridge to St Neots
3. Bedford to St Neots
4. Sandy to Buckden

Table 4.3 : Journey Time Impact

Route	Direction	Percentage change from Do Minimum					
		DS1_A	DS1_B	DS1_C	DS1_CP	DS5_CP	DS6_CP
1	EB	-18%	-19%	-19%	-18%	-20%	-20%
	WB	-21%	-22%	-21%	-21%	-22%	-22%
2	EB	-16%	-16%	-16%	-16%	-7%	-7%
	WB	-12%	-12%	-11%	-11%	-4%	-4%
3	EB	-1%	-2%	0%	1%	2%	2%
	WB	-10%	-11%	-8%	-7%	-6%	-6%
4	NB	1%	-2%	1%	0%	1%	1%
	SB	-3%	-2%	-3%	-3%	-3%	-3%

We can see that all options are expected to have significant impacts, particularly for East-West movements.

4.2.3 Impact on Traffic Volumes

The greatest impact of the scheme to current road conditions is expected to be felt on the existing single carriageway A428 between Cambridge Road Roundabout and Caxton Gibbet Roundabout where non-local traffic is likely to divert to use the new offline expressway.

Flows for this section of road have been extracted from SATURN for each of the DS scenarios and the DM to allow for a comparison. The results of the 2023 AM comparison for all vehicles is shown in **Table 4.4** while a comparison for HGVs only is shown in **Table 4.5**.

Table 4.4 : 2023 AM reduction in Flow (all vehicles)

Section	Direction	Percentage change from Do Minimum					
		DS1_A	DS1_B	DS1_C	DS1_CP	DS5_CP	DS6_CP
Cambridge Road – St Ives Road	EB	-69%	-70%	-69%	-69%	-44%	-50%
	WB	-82%	-81%	-82%	-83%	-43%	-82%

Table 4.5 : 2023 AM reduction in Flow (HGVs)

Section	Direction	Percentage change from Do Minimum					
		DS1_A	DS1_B	DS1_C	DS1_CP	DS5_CP	DS6_CP
Cambridge Road – St Ives Road	EB	-83%	-84%	-85%	-85%	-43%	-50%
	WB	-92%	-93%	-92%	-92%	-43%	-82%

From this we can see that all options perform similarly and remove the majority of traffic from the road, this reduction in traffic leads to improved journey times and safety for local users of the route.

Significantly heavy vehicle traffic is dramatically reduced in all options.

4.3 Response to TAME Advice Note Question 2

From the above information we can now answer the question:

Knowing the benefits of the preferred option, what impact would a modal alternative require in order to relieve the problem the same degree and is that viable?

We have seen that the proposed highway interventions will significantly alter the current travel conditions and as such can estimate what an alternative mode solution would need to do to relieve the problem to the same degree.

To achieve similar results to the best performing Highways solution an alternative mode solution would need to:

- Reduce journey times between Bedford and Cambridge by 19% in the eastbound direction and 21% in the westbound direction.
- Reduce journey times between Cambridge and St Neots by 16% in the eastbound direction and 11% in the westbound direction.
- Reduce westbound journey times between St Neots and Bedford by 7%.
- Reduce southbound journey times between Buckden and Sandy by 3%
- Remove 70% of eastbound traffic and 83% of westbound traffic from the single carriageway A428.
- Remove 85% of eastbound HGVs and 92% of westbound HGVs from the single carriageway A428.

As shown previously a bus based solution would still be constrained by the performance of the current road network and any improvement for bus services (such as introduction of guided busways/bus priority lanes) is extremely unlikely to significantly impact traffic to relieve conditions compared to that of a highways solution and would have no impact on freight movements.

A rail alternative to the A428 for east-west travel between Cambridge and Bedford could potentially lead to changes in traffic conditions, however, it is extremely unlikely that this would achieve a high enough mode shift to compare to performance of a highways solution. East-West Rail does propose to introduce a line for this movement, however, without a stop at St Neots (a large generator or attractor of trips on the A428) it is unlikely that significant modal shift on the existing A428 would be witnessed. For North-South trips through Black Cat roundabout we know that currently there is significant queuing and delay in the peak hour, this is despite frequent services on the East Coast Mainline (ECML) that runs approximately parallel to the A1.

Any other public transport solutions are very unlikely to offer the same level of relief to traffic as a rail solution, however, even a rail solution achieving the performance of a highways solution is not considered viable.

5. Summary and Conclusions

This report has shown that the A428 between Black Cat Roundabout and Caxton Gibbet roundabout suffers from a number of issues that affect the performance of both East-West on the A421 and A428 and North-South travel on the A1.

The report has shown that car is the dominant form of transport in the area, with the number of people using public transport well below the national average which in turn is exacerbating the problems on the highway network. This is in part due to the lack of provision of East-West public transport which is not currently served by rail and is instead limited to local bus services and cross-country coach services which are constrained by the performance of the highway network.

The problems experienced are likely to be exacerbated in the future by population and traffic growth in the region. These problems have in turn informed scheme specific objectives for any potential improvement.

A large number of options were considered in the option generation phase of the project, including non-highway interventions, however, the only options considered “viable” were highway solutions.

The performance of these highway solutions (as assessed using SATURN modelling software) have been reviewed to assess whether any non-highway solution could potentially offer a similar level of performance in relieving delay for major movements and removing flow from single carriageway roads nearing capacity. It is not considered likely that a non-highways solution could offer as significant an improvement in traffic conditions as those offered by a highways solution.