A428 Black Cat to Caxton Gibbet improvements

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9.39 Overview of the Alternatives considered at the Black Cat Junction

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1 Introduction

1.1.1 This report seeks to address action points 3 and 4 that were identified by the Examining Authority (ExA) following Issue Specific Hearing 3 (ISH3) held on 24 September 2021 covering environmental matters. The ISH was held as part of the Examination into the A428 Black Cat to Caxton Gibbet improvements (the Scheme).

1.1.2 The action points identified by the ExA were as follows:

a. Action Point 3 - Applicant to provide evidence to show that reasonable alternatives that did not require the demolition of Brook Cottages, were considered, and consulted upon with Bedford Borough Council, Historic England and other parties, in particular if any of the discounted options involved moving the Black Cat junction option East of its current and proposed position. Those option proposals to also be provided.

b. Action Point 4 - Applicant to provide the evidence underpinning the criteria relied upon in the initial assessment of alternatives for Black Cat junction options, in particular the evidence relied upon to dismiss the options that did not require the demolition of Brook Cottages.

1.1.3 Responses on this topic have been provided previously by the Applicant at ISH1, which examined strategic matters, and in response to Action Point 4 from ISH1 that required 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 particularly reference to historic environment, flood risk and floodplain compensation, land take, effects on other residential and commercial uses, the restoration of the quarry, and on the gas main to the south of the existing roundabout"*. The Applicant's response is set out in the Applicant's response to actions arising from Issue Specific Hearing 1 on 18 August 2021 **[REP1-034]**. The relevant documents relating to the topic of alternatives considered at Black Cat junction include the following:

a. Chapter 3 of the Environmental Statement, Assessment of Alternatives **[APP-072].**

b. Case for the Scheme **[APP-240]**.

c. Black Cat Junction Design Options **[APP-247]**.

d. Applicant's response to actions arising from Issue Specific Hearing 1 on 18 August 2021 **[REP1-034].**

1.1.4 In providing a response to the ExA on the action points arising from ISH3, this report sets out:

a. An overview of the Project Control Framework (PCF) process which is the process that provides the structure and governance for all National Highways schemes from inception to construction and operation. This provides the background and context to the approach taken to the development of the Scheme in order that it can be understood how the development of options at

the Black Cat junction were developed, assessed and either discounted or taken forward into a later stage.

b. A summary of the Scheme objectives and how they developed with reference to National Highways and Scheme strategies, plans and requirements.

c. An explanation of the Scheme development from Stage 1 of the PCF process to Stage 3 setting out option identification, option selection and scheme development to preliminary design. This section considers:

   i. The evidence of the reasonable alternatives considered for the Black Cat junction that did not require the demolition of Brook Cottages and which were consulted upon with Bedford Borough Council, Historic England and other parties.

   ii. The evidence of options that considered moving the Black Cat junction east of its current location and why this was discounted.

   iii. The evidence underpinning the criteria relied upon in the initial assessment of alternatives for Black Cat junction options.

   iv. The evidence relied upon to dismiss the options that did not require the demolition of Brook Cottages.

1.1.5 Chapter 3 of the Environmental Statement, Assessment of Alternatives **[APP-072]** confirms the Scheme has been subject to a process of staged development. The approach and outcomes of the assessment of alternatives for the main route and Black Cat Junction options at each stage of development are recorded in the reports listed in Paragraph 1.1.6 and the reports referenced in Chapter 3 of the Environmental Assessment including:

a. Option Assessment Report (March 2016) **[APP-035]** provided in Appendix E

b. A428 Black Cat to Caxton Gibbet Consultation Brochure (March 2017) **[APP-035]** provided in Appendix F.

1.1.6 The Applicant prepared several documents during Stages 1 and 2 that detail the traffic, design, environmental and economic considerations and the assessment of the reasonable alternatives studied for the main route options between the Black Cat and Caxton Gibbet junctions and for the Black Cat Junction options. These reports are provided in Appendices G to K. Table 1-1 sets out a glossary of the documents referred to in this report and a summary of their role and purpose.

Table 1-1 - Glossary of Documents referenced in this report

Document	Summary of Role/Purpose
Option Assessment Report (March 2016) **[APP-035]**	Presents the outcomes of the first stage of the scheme appraisal process. Key outcomes: - Review and document the current transport situation - Analyse the future transport situation

Document	Summary of Role/Purpose
	- Identify the need for intervention and identify objectives that are consistent with Highways England's policies and desired outcomes - Review and assess the potential options that address the need
Technical Appraisal Report (November 2016) in Appendix G	Brings together the PCF Stage 1 option appraisal work from the multi-disciplinary team for the whole scheme. Key outcomes: - Validation of the need for intervention within the framework of the scheme objectives - Identify and evaluate intervention options with regard to engineering, safety, social and environmental factors, economy and economic assessment including value for money - Describe the alternatives investigated and set out any reasons for rejection - Recommend options for public consultation
Stage 1 Environmental Assessment Report (December 2016) in Appendix I	Presents the environmental assessment work completed during Stage 1. Key Outcomes: - Outlines the environmental opportunities and constraints identified - Describes how the environment has been considered in the option appraisal process - Outlines the scope of future environmental work during project development
Annex to the Technical Appraisal Report (May 2017) in Appendix H	Additional report as an annex to the Technical Appraisal Report, focusing on the Black Cat Junction. Outlines the option appraisal work completed specifically for the junction
Stage 2 Environmental Assessment Report (June 2017) in Appendix J	Builds on the Stage 1 Environmental Assessment Report describing the environmental baseline, and potential impacts and mitigation associated with the options under consideration - Summarises the option appraisal work completed to date

Document	Summary of Role/Purpose
	- Details the environmental assessment for the options presented at Non-Statutory Consultation
Scheme Assessment Report (January 2018) in Appendix K	Summarises the scheme assessment completed up to the end of Stage 2, post non-statutory consultation. - Technical assessment of the options presented at consultation - Comparison of the options performance against objectives

2 Overview of the Project Control Framework Process

2.1 Chapter Overview

2.1.1 Chapter 2 of this report provides an overview of the Project Control Framework (PCF) to assist the Examining Authority in understanding the framework against which National Highways develop and deliver major projects. The stages referred to below are referenced throughout Chapter 4 of this report to show how options for the Black Cat junction were developed. It should be noted that options within PCF Stage 1 were developed for the whole route and not individually for Black Cat Junction and options for Black Cat junction specifically were developed from PCF Stage 2 onwards.

2.1.2 The PCF process sets out how National Highways manage and deliver major improvements projects. All major projects follow a standard lifecycle that is split into three phases and seven stages, with a pre-project stage (Stage 0 - strategy, shaping and prioritisation). The stages align with key decision points in a project's development and delivery. The PCF is designed to help project teams work together to develop and deliver major projects. It comprises:

a. A standard project lifecycle.

b. Standard project deliverables.

c. Project control processes.

d. Governance arrangements.

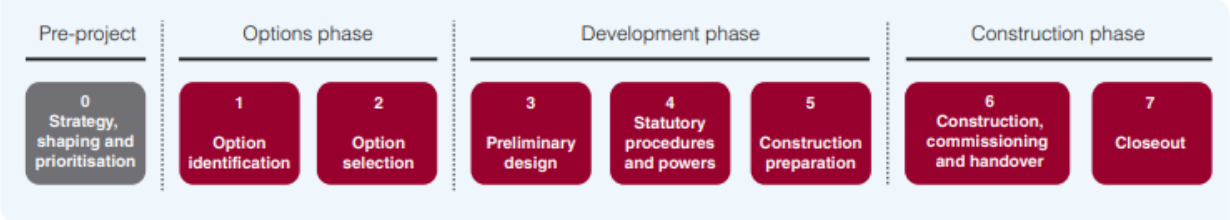
2.1.3 The three phases of the PCF process following a pre-project (Stage 0) are as follows:

a. **Options phase** (Stages 1-2) – identifies the preferred road solution to the transport problem. By the end of the phase there is certainty over the approach.

b. **Development phase** (Stages 3-5) – focusses on the design of the preferred solution taking it through the necessary statutory processes up to the point where a decision to commit to invest in building the road solution can be made.

c. **Construction phase** (Stages 6-7) – is where the road solution is built, handed over for operation and the project is completed.

2.1.4 There are a number of stages within the three phases, which are shown in



2.1.5 **Figure** 2-1.

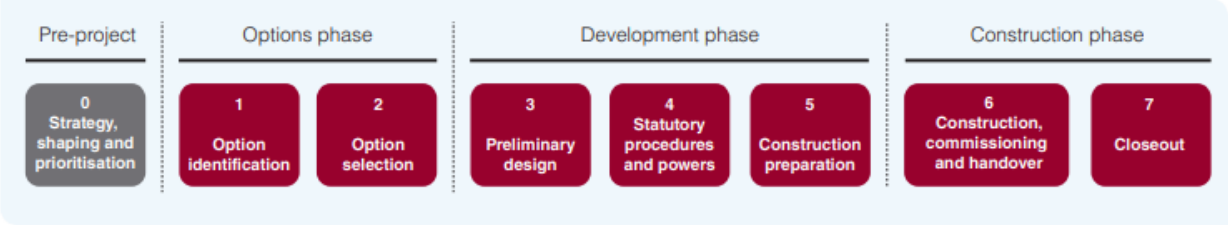


Figure 2-1 – Major Projects Lifecycle

2.1.6 National Highways has produced an indicative DCO Process Map that sets out the main Assessment, Statutory Process, Infrastructure, Governance and Operations activities as a flow chart for all PCF Stages. An extract from National Highways Options and Development Phase Process Map showing activities for Stages 0, 1 and 2 is provided at Appendix D of this report. The durations assumed for design and assessment activities on the Process Map are observed averages.

3 Development of the Scheme Objectives

3.1 Chapter Overview

3.1.1 Chapter 3 of this report seeks to assist the Examining Authority in understanding how the Scheme objectives were developed. At Issue Specific Hearing 3 **[EV-021]**, part of the discussion centred around whether a Scheme objective relating to cultural heritage would have led to a different outcome for Brook Cottages. The Applicant considers that including heritage as an objective would not necessarily have led to a solution which avoided Brook Cottages, and it does not follow that heritage was given any less weight in considering and assessing the options.

3.1.2 Whilst environment in its broadest sense forms part of the Scheme objectives, cultural heritage was not specifically identified within them. Early stage scheme objectives were necessarily focussed mainly on delivering a technically acceptable solution which met the requirements of the Road Investment Strategy. However, this did not affect the Applicant's approach to considering a wide range of environmental factors, including cultural heritage, in options development and selection as explained further below.

3.2 Development of Scheme Objectives

3.2.1 The development of objectives for National Highways major projects is based on the consideration of a number of factors including the Key Performance Indictors (KPIs) set out in the Road Investment Strategy (2015 to 2020 (RIS1) and 2020-2025 (RIS2), the Highways England Delivery Plan (2015-2020) and the A428 Black Cat to Caxton Gibbet Client Scheme Requirements. As a project is taken through the PCF process, the scheme objectives are re-assessed as the scheme is developed and more information becomes available through undertaking surveys, developing the design and traffic models, assessment of options and stakeholder engagement. Set out below are the requirements, KPIs, and strategic outcomes that also provided the context to the development of the objectives for the Scheme through the staged development process.

3.3 Road Investment Strategy 2015 – 2020

3.3.1 A number of KPIs and sub-set of Performance Indicators (PIs) were included in the first Road Investment Strategy (RIS1) in order to assess performance of National Highways and the Strategic Road Network (SRN). The KPIs and other relevant environmental Performance Indicators (PIs) from the Road Investment Strategy are set out in **Table 3-1**. The KPIs and PIs set out are from the first Road Investment Strategy which covered the period 2015 - 2020. This was the relevant document at the time of development of the Scheme objectives.

Table 3-1 – Key Performance Indicators from the Road Investment Strategy (2015-2020)

	Key Performance Indicator
Road Safety	The number of people Killed or Seriously Injured on the Strategic Road Network (SRN).
User Satisfaction	The percentage of National Road Users' Satisfaction Survey respondents who are very or fairly satisfied.
Traffic Flow	Network Availability: the percentage of the SRN available to traffic. Incident Management: Percentage of motorway incidents cleared within one hour
Economic Growth	Average delay (time lost per vehicle per mile)
Environment	Noise: Number of Noise Important Areas mitigated. Biodiversity: Delivery of improved biodiversity, as set out in the Company's Biodiversity Action Plan There was also a subset of environmental Performance Indicators relating to: Air Quality: to make progress on reducing the negative impacts on air quality which will support wider Government initiatives targeted at improving air quality. Carbon Dioxide, and other greenhouse gas emissions: to help reduce carbon dioxide, and other greenhouse gas emissions, in line with current and future government targets
Cyclists, walkers and other vulnerable users	The number of new and upgraded crossings
Efficiency	Cost Savings: Savings on capital expenditure Delivery plan progress: progress of work relative to forecasts set out in the delivery plan, annual updates to that plan, and expectations at the start of Roads Period 1 (RP1)
Network Condition	The percentage of the pavement/road surface asset that does not require further investigation for possible maintenance

3.3.2 The scheme objectives in Stage 1 were based around the general RIS1 objectives as follows and as noted in the Option Assessment Report (March 2016) **[APP-035]**:

The RIS outlines Highways England's long term ambition to revolutionise and modernise the SRN and sets out the performance requirements for how it aims to achieve this. The performance will be assessed in eight key areas and as such these have been adopted as the study objectives:

- *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*

3.3.3 The second Road Investment Strategy (RIS2) which covers the period 2020-2025 also sets out KPIs for delivering environmental outcomes. As part of the RIS1 Performance Specification, National Highways was also required to develop new metrics to reflect the fuller extent of the environmental impact of the SRN. The list of KPIs were updated to also include air quality and carbon emissions. A set of four supporting PIs were developed to complement the KPIs in measuring National Highways overall environmental performance. The condition of cultural heritage assets became a performance indicator but this related to the condition of National Highways owned cultural heritage assets, for example milestones and historic sites on or near the SRN.

3.4 National Highways Delivery Plan 2015-2020

3.4.1 The National Highways Delivery Plan which covered the period 2015-2020 set out how the strategic outcomes identified in the first Road Investment Strategy would be delivered. The strategic outcomes were:

a. Supporting economic growth.

b. A safe and serviceable network.

c. A more free-flowing network.

d. Improved environment.

e. An accessible and integrated network.

3.4.2 In terms of (d) above, the delivery plan notes that the government has set out specific targets in relation to noise and biodiversity and that an Environment Fund would deliver specific environmental enhancements on and around the network. This is part of the Designated Funds initiative which is managed outside of the Development Consent Order (DCO) process.

3.5 Client Scheme Requirements

3.5.1 The Client Scheme Requirements (CSR) are owned by the Department for Transport. The document is produced jointly, by the Department for Transport as client, and National Highways as delivery body. It is updated periodically to reflect the Scheme's development and should be reviewed at each PCF stage. Initially the CSR is a high level statement of the scope required, and is replaced by a full project description once the preferred option can be defined and solution type identified. The CSR is consistent with objectives and descriptions in the Roads

Investment Strategy (RIS) and illustrates alignment of the Scheme with local, regional and national objectives. It also sets out National Highways requirements for the project covering a high level definition of the transport challenges and issues, objectives, project outputs and costs. The high level Scheme overall objectives for PCF Stage 3 are set out in **Table 3-22**.

Table 3-2 – Client Scheme Requirements High Level Objectives

Economic growth	To support significant levels of planned economic growth in Cambridge and the surrounding sub-region, which is one of the fastest growing areas of the UK.
Transport	To reduce traffic congestion, provide adequate capacity to support future growth forecasts, improve journey time reliability and increase resilience against accidents and incidents.
Environment	To protect the built and natural environment by mitigating the potentially adverse impact of adding additional capacity where technically feasible and economic to do so.
Community	To enhance accessibility and reduce severance for non-motorised road users where technically feasible and economic to do so.

3.6 Scheme Objectives at Non-Statutory Public Consultation

3.6.1 A non-statutory consultation of the Scheme was held from March to April 2017 which sought views on route options and options for a new junction at Black Cat roundabout. At this point in time, the benefits and objectives of the Scheme were as set out in the consultation brochure **[APP-035]** and are shown in **Table 3-3**.

Table 3-3 – Scheme Objectives at Non-Statutory Consultation

Strategic Outcome	Objective	Benefit
Enabling Economic Growth	By supporting planned economic and housing growth in Cambridgeshire, Bedfordshire and the surrounding region.	Connectivity enables economic growth. Improved journey times and reliability brings people and businesses closer together, creates job opportunities and long-term sustainable growth. Increasing road capacity now will also help to meet predicted demand in the future.
A Safe and Serviceable Network	By contributing to the improvement of safety across the network.	The scheme would improve safety for all road users and road workers. Tackling congestion helps to reduce the risk of accidents.
A more free-flowing network	By significantly improving the capacity at Black Cat roundabout, where the A1 currently meets the A421 and by building a new dual	A free-flowing network with less congestion benefits local residents, daily commuters and businesses. The increased resilience would

Strategic Outcome	Objective	Benefit
	carriageway with increased resilience between the A421 and the existing dual carriageway of the A428.	help the road network cope with incidents including collisions, breakdowns, maintenance and extreme weather, creating more reliable journey times for everyone.
An improved environment	By reducing the impact of new infrastructure on the natural and built environment through design. The scheme would also improve the environmental impact of transport on communities around the Black Cat roundabout and along the existing A428.	By focusing on the environment at the design stage, the scheme would seek to improve the environmental impact on local communities in areas such as air quality and noise pollution. It would also mitigate any impacts on cultural heritage
A more accessible and integrated network	By providing a safe alternative route for walkers, cyclists and equestrians and seeking to address severance. The scheme would also improve safety and access for those who use public transport.	Ensuring the safety of cyclists, walkers and equestrians improves access and integration with neighbouring communities for everyone. The scheme also aims to improve connections between communities and villages for those who travel by public transport.
Customer satisfaction	Customer service is at the heart of what we do.	Listening to what is important to our customers will deliver a better road for everyone and improve customer satisfaction.

3.6.2 In terms of the objective relating to ‘an improved environment’, alongside improving the environmental impact on local communities in areas such as air quality and noise pollution, it was also set out that impacts on cultural heritage would be mitigated (as can be seen in **Table 3-3** above) by considering the potential scheme impacts on them at the early scheme development stages. Whilst this was primarily focused on those cultural heritage assets within the study area that were defined as having a high value such as Croxton Park and Tempsford Bridge, assets considered to be of medium value, such as Brook Cottages as a Grade II listed building, were also considered. Due to its location next to the existing A1 and the constrained nature of the site in this area, it was anticipated that the cottages would be either directly or indirectly impacted.

3.7 Scheme Benefits at Preferred Route Announcement

3.7.1 A Preferred Route Announcement (PRA) **[APP-035]** was made in February 2019 which explained the reasons for choosing the route option and junction option for Black Cat. At this point, the Scheme benefits were set out in the PRA as shown in **Table 3-4**.

Table 3-4 – Scheme Benefits at Preferred Route Announcement

	Benefit
Provide a more free-flowing network	Free flowing junctions and increased capacity on the new dual carriageway will reduce congestion and will create a reliable route between the Black Cat and Caxton Gibbet junctions. We will cut journey times by more than a third at peak times.
Provide a safe and serviceable network	Tackling congestion helps Highways England provide, operate and maintain a network that is safe for our customers to use and for our people to maintain.
Enable economic growth	Improving connectivity in the region will enable growth in jobs and housing. The increase in road capacity will improve journey times and help to meet predicted demand in the future.
Delivering environmental improvements	The scheme as a whole will have a beneficial impact on noise and air quality for the surrounding area. We will maintain existing levels of biodiversity and leave a positive legacy for nearby communities by providing new landscape planting and wildlife areas.
Improve travel for horse riders, cyclists and walkers	We will improve the safety of horse riders, cyclists, walkers and those who use public transport by improving connections between communities.
Better resilience	We will improve the ability of the road network to cope with accidents and disruption.

3.7.2 The scheme benefits include references to noise, air quality, biodiversity and landscape, which were considered to be the main environmental benefits of the Scheme that could be delivered at that stage. All environmental matters continued to be assessed and given equal weighting. The design of the Black Cat Junction was developed further in advance of the Preferred Route Announcement, but this further review had shown that all three options would result in the demolition of Brook Cottages. However, the Applicant did develop a variation of the preferred layout design (Option C) with the specific aim of retaining Brook Cottages, whilst still delivering the Scheme objectives. This work is described in the Black Cat Junction Design Options report **[APP-247]**.

3.8 Scheme Objectives at Statutory Public Consultation

3.8.1 Following completion of the route and Black Cat Junction option assessment, the Scheme was developed at PCF Stage 3. This next stage in design development took into account the wider factors that needed to be reflected in the Scheme objectives (see the documents explained in Section 3.2 to 3.4 of this section), and an updated set of Scheme objectives were developed. These objectives were included in consultation material used for the statutory consultation carried out from June 2019 to July 2019. The Scheme objectives were as set out in **Table 3-5**, and these continue to be the objectives for the Scheme.

Table 3-5 – Scheme Objectives at Statutory Consultation

Connectivity	Cut congestion and increase capacity and journey time reliability between Milton Keynes and Cambridge.
Safety	Improve safety at junctions, side roads and private accesses by reducing traffic flows on the existing A428. Improve safety on the A1 by removing existing side road junctions and private accesses onto the carriageway.
Economic Growth	Enable growth by improving connections between people and jobs and supporting new development projects.
Environmental Improvements	Maintain existing levels of biodiversity and have a beneficial impact on air quality and noise levels in the surrounding area.
Accessibility	Ensure the safety of cyclists, walkers, horse riders and those who use public transport by improving the routes and connections between communities.
Resilience	Improve the reliability of the road network so that it can cope better when accidents occur.
Customer Satisfaction	Listen to what is important to our customers to deliver a better road for everyone and improve customer satisfaction.

3.8.2 The objective relating to 'environmental improvement' developed for the Statutory Public Consultation is aligned to the Client Scheme Requirements, but focuses on the KPIs for biodiversity, air quality and noise included in the first Road Investment Strategy.

3.9 Summary of development of Scheme objectives

3.9.1 As has been demonstrated, the scheme objectives are influenced by a number of strategic documents which set out requirements, key targets and strategic outcomes, and it is therefore incumbent on individual schemes to deliver these. Furthermore, the PCF process enables objectives to evolve over time to reflect the stage of scheme development. The objectives become more refined as there is more certainty about the scheme design and the benefits which schemes can realistically deliver.

3.9.2 Whilst cultural heritage was not a specific Scheme objective, minimising impacts on cultural heritage was recognised as a benefit of the improved environment Scheme objective at non-statutory consultation. As is demonstrated in Section 4 below, cultural heritage was given full and equal weight in option consideration and assessment with other environmental, technical, etc criteria. Therefore, the absence of reference to cultural heritage in the specific Scheme objectives, and the updated Scheme objectives at statutory consultation, did not affect the outcome of the options selection process or mean that any less weight was given to heritage considerations in the options selection process, or to the Applicant's attempts to minimise impacts on cultural heritage thereafter.

4 Scheme Development from PCF Stage 0 to Stage 3

4.1 Chapter Overview

4.1.1 Chapter 4 of this report seeks to assist the Examining Authority in understanding how the Scheme developed through the Stages 0, 1 and 2 of the Project Control Framework, and specifically how the route options and the alternative junction options for the Black Cat junction were considered. It should be noted that options within PCF Stage 1 were developed for the whole route and not individually for Black Cat Junction and options for Black Cat junction specifically were developed from PCF Stage 2 onwards.

4.1.2 Following on from the background provided in Chapters 2 and 3 of this report, Chapter 4 critically sets out the evidence to show that reasonable alternatives that did not require the demolition of Brook Cottages were considered, including options that involved moving the Black Cat junction east of its current and proposed position. The Applicant also sets out the evidence underpinning the criteria relied upon in the initial assessment of alternatives for the Black Cat junction options, in particular the evidence relied upon to dismiss the options that did not require the demolition of Brook Cottages.

4.2 Introduction to development of major road projects

4.2.1 Section 2 of this report described the PCF and the stages within a major road projects lifecycle. The number of options reduces as the Scheme is progressed through the Options Phase, whilst the level of detail and granularity of option assessment increases.

4.2.2 The Options Identification and Selection stages (PCF Stages 1 and 2) are undertaken in alignment with the Transport Analysis Guidance (TAG, formerly the Web-based TAG or WebTAG) process. The pre-project stage (PCF Stage 0) determines the need for intervention, in the context of the current and future transport situation. Stage 0 also identifies the objectives for the project, should it be deemed an intervention is required. During Stage 1, options are generated and sifted in an increasingly granular way with greater levels of option development and assessment completed prior to each sift, as an iterative process. Sifting is completed against each option's ability to be delivered and performance against the scheme's objectives. During Stage 2, the best performing options are presented for non-statutory consultation and then further developed based on consultation feedback. A final sift of the remaining options is then completed to determine a preferred option for progression.

4.2.3 The approach for option identification and assessment in accordance with the PCF process is summarised in **Figure 4-1.** This figure also provides an indicative timeline which shows dates for the start of the PCF stages and when the relevant assessment reports were produced. On the A428 Scheme, only route options were assessed during PCF Stages 0 and 1. The shortlist of route options and Black Cat junction options were assessed during PCF Stage 2. The Preferred Route Announcement is made at the end of Stage 2 and the Preliminary Design and Environmental Statement is produced in Stage 3.

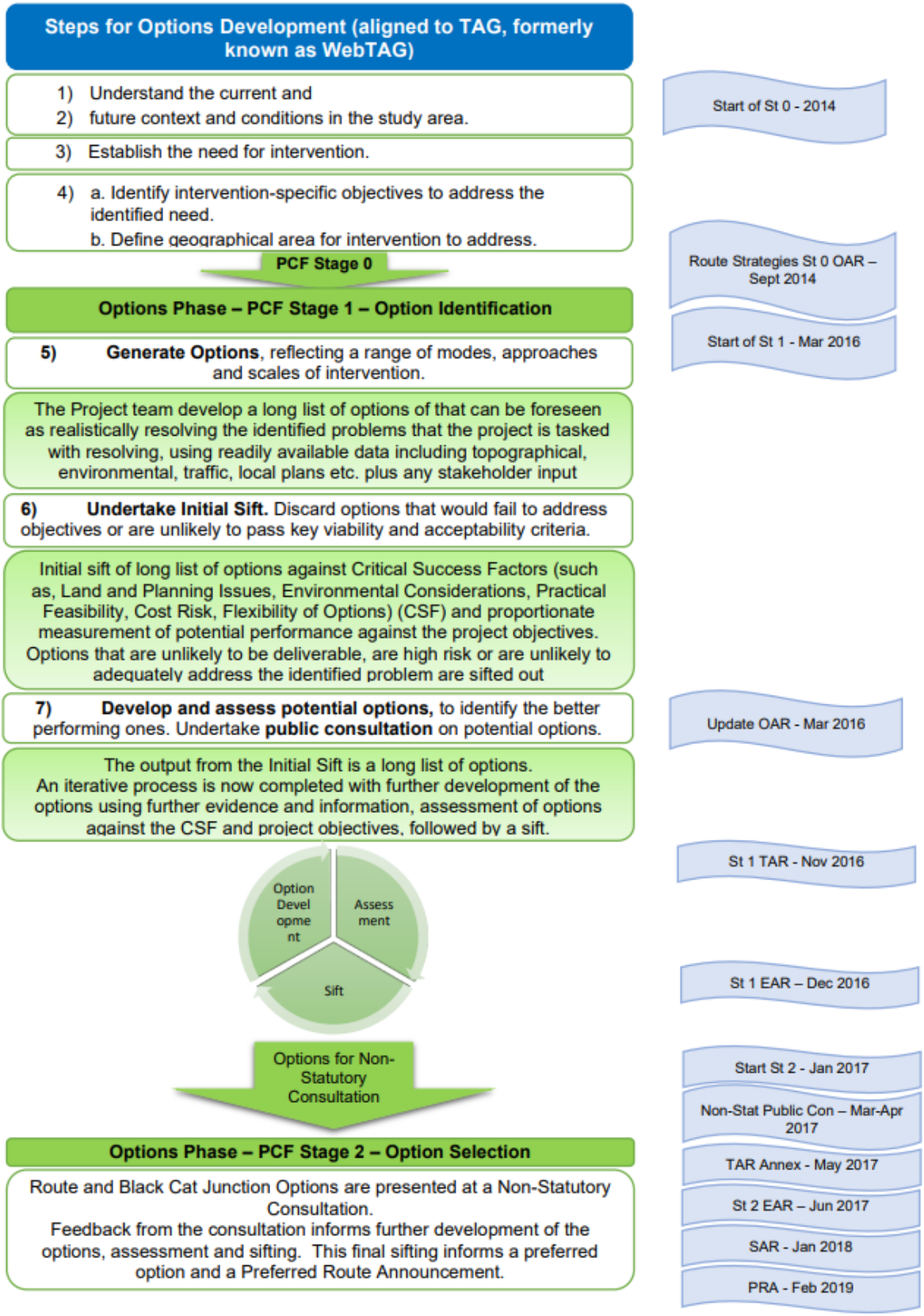


Figure 4-1 - Option identification and assessment approach

4.3 PCF Stage 0 – Strategy, shaping and prioritisation

4.3.1 The overarching objective of PCF Stage 0 – Strategy, Shaping and Prioritisation is:

a. Identification and prioritisation of potential transport issues.

b. Shaping, investigation and assessment of the viability of transport scheme solutions to the problem, including road network solutions.

c. To produce a strategic outline business case.

d. The initiation of a major roads project (if deemed the most viable solution to the transport issue).

4.3.2 In this stage the Applicant considered a number of topics around the scope, business case, costing, risk, value management and environment but only related to the route between the Black Cat Junction and the Caxton Gibbet Junction. Feasibility studies were undertaken, potential options were identified and initial analysis and appraisal was conducted to assess the viability of these transport scheme solutions to the transport problem. The outputs were reported in the Stage 0 Option Assessment Report (OAR) entitled 'Route Strategies: Option Assessment Report, A428: A421 to Caxton Gibbet dated September 2014 as described in Chapter 3 Assessment of Alternatives **[APP-072]** of the Environmental Statement.

4.4 Stage 1 – Option identification

4.4.1 The overarching objectives of PCF Stage 1 – Option Identification for the Scheme was to:

a. Identify route options to be taken to public consultation.

b. Assess these options in terms of environmental impacts, traffic forecasts and economic benefits.

c. Refine the cost estimate of options (including an allowance for risk).

4.4.2 In order to achieve these objectives, the Applicant prepared a number of documents that detail the traffic, design, environmental and economic considerations for the route options taken forward during Stage 1.

4.4.3 The route option generation and sifting process is described in the updated Option Assessment Report (OAR) **[APP-035]** and the Technical Assessment Report (TAR) in Appendix G. The OAR and TAR considered the existing traffic problems, the need for interventions and the development of options to meet the overall scheme requirements (presented in the Client Scheme Requirements, see section 3.4 of this report). These two reports are considered below.

4.4.4 **Table 4-1** summarises the further option identification and assessment activities undertaken during Stage 1 to develop the work carried out at Stage 0. The table also confirms the number of route options under consideration at each phase in the process and confirms the relevant document reference as reported in the updated Option Assessment Report (OAR) **[APP-035]**.

Table 4-1 - Stage 1 Updated option identification and assessment summary

Timeline	Activity	Outcome	Document Reference
Stage 1 - (March 2016 to December 2016	Generate Options: Initial consideration of all potential interventions to solve identified problems	50 Route Options	OAR (Section 7 and Appendix F)
	Pre-EAST Assessment and Sift: Each option assessed against identified problems and route objectives	16 Route Options	OAR (Section 8 and Appendix H)
	EAST Assessment and Sift: Each option assessed against EAST criteria	8 Route Options	OAR (Section 8 and 9 and Appendix I)

4.4.5 The updated OAR sets out that a long list of route options was developed that were categorised into lane widening, junction improvement strategy, offline alignment and public transport improvements. A two stage sifting process was then undertaken.

4.4.6 The first sift assessed the long list of 50 route options based on their ability to meet identified problems, study objectives, scheme deliverability and scheme feasibility. Route options were scored on a five point scale against each problem and objective, which had then been combined to produce an overall score. All the options were assessed against the Route Objective of "Delivering Better Environmental Outcomes", which considered overall environmental impact of the Scheme. The scoring process is based on qualitative evidence as far as possible as well as professional judgement where required. At this stage the potential cost of the project was not considered. Following this process 16 options were then taken forward for the second stage of the sifting process.

4.4.7 In the second sifting stage, the short-listed 16 route options were assessed using the Department for Transport's Early Assessment and Sifting Tool (EAST). It is noted in section 8.3 of the OAR that this was based on an assessment of the options against the Government's Five Case Model. The Financial and Economic Case considered affordability, capital costs and revenue costs at a high level with a potential cost banding attributed to each option. The Commercial Case considered the source of the funding and any income generated for the options. The beneficial or adverse impact on the local environment was considered at high level for the whole scheme at this stage. The outcome of the EAST assessment is set out in Appendix I of the OAR **[APP-035]**.

4.4.8 Following a review of EAST, eight combined route and junction options that were likely to be deliverable and feasible whilst addressing the identified problems and route objectives were shortlisted. The economic, environmental, social and commercial impacts were presented in the Appraisal Summary Tables in Appendix K of the OAR **[APP-035]** for each of the 8 route options and associated junction strategy. The historic environment was qualitatively considered during this process, but at this stage the Applicant was considering higher level route options over a significant length of road. It was acknowledged that options for

junction design would, as explained below by reference to Brook Cottages, require their own discrete analysis. But at this stage the assessment focussed on broader cultural heritage considerations viewed across a wider sweep of land. The historic environment of the offline dualling options (i.e. located away from the existing A428 corridor) was considered to have the potential for large adverse effects due to number of the high level cultural heritage assets along the route in the study area.

'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 existing A428 is likely to result in a much reduced qualitative effect than a route to the south.'

4.4.9 The shortlisted route options were taken forward for a further technical appraisal and environmental assessment during Stage 1 as reported in the Technical Appraisal Report (TAR) in Appendix G and Stage 1 Environmental Assessment Report (EAR) in Appendix I. Cost estimates were produced for the shortlisted options to inform the economics and the Financial Case of the business case.

4.4.10 The Technical Appraisal Report (TAR) brings together the traffic, economic, safety, operation, maintenance and environmental assessments for the route option proposals and potential alternative junction strategies, thus forming the basis for deciding which option(s) should be included in the non-statutory public consultation. Cultural heritage was considered at this stage as part of the wider high-level environmental assessment for the options. The environmental assessment considered whether there was likely to be a significant effect, both positive and negative, for each of the environmental topics. The significance of the effect of an impact was derived through consideration of the sensitivity of a receptor (referred to as its value or importance) and the likely magnitude of the impact. Only the effects on Croxton Park (a Registered Park and Garden) was reported in the summary of assessment, the impact on Brook Cottages and other cultural heritage assets was not mentioned, because the assessment considered the positive and negative significance of effects on the route options rather than junctions. Chapter 10 of the TAR describes the eight route options, Options 1, 3, 4, 5 and 6 (Figure 10.2, 10.4, 10.5, 10.6 and 10.7 respectively). These offline dual carriageway route options include a three tier grade separated junction at Black Cat. Options 2, 7 and 8 (Figure 10.3, 10.8 and 10.9 respectively) are variants consisting of online and junction improvements along the existing A428 corridor.

4.4.11 **Table 4-2** summarises the next stage of option identification and assessment activities undertaken during Stage 1. The table confirms the number of route options under consideration during the next phase in the process and confirms the relevant document reference as reported in the Technical Appraisal Report (TAR) in Appendix G.

Table 4-2 - Stage 1 Option identification and assessment summary

Timeline	Activity	Outcome	Document Reference
Stage 1 (March 2016 to December 2016)	Generate Options: Interdisciplinary Workshop to identify long list of options based on the 6 emerging from earlier Stage 1 assessment	16 Route Options	TAR (Section 10)
	Sift of Options to discard options that were considered variants of other options and therefore added little value to the Stage 1 assessment or had been discounted in earlier assessment work	4 Route Options	TAR (Section 10)
	Consider alternative offline options with an additional 5 options added	9 Route Options	TAR (Section 10)
	Assessment and Sift of the additional 5 off-line options	6 Route Options (4 plus 2 additional off-line)	TAR (Section 10)
	Consider 'low cost' options to meet budget constraints with additional 6 options added	12 Route Options	TAR (Section 10)
	Assessment and Sift of the 6 options with 2 additional 'low cost' options involving junction improvements on the existing A428 corridor	8 Route Options (6 plus 2 'low cost')	TAR (Section 10)
	Assessment of the 8 options	8 Route Options	TAR (Section 11 - 18) St 1 EAR (Section 2-4)
	Sift Options to identify best performing Options and recommend the options to progress to Stage 2 and the Non-Statutory Consultation	3 Route Options	TAR (Section 20)

4.4.12 The Stage 1 Environmental Assessment Report (EAR) in Appendix I considered the baseline environment for the whole route (including cultural heritage specifically in section 2.2) and an appraisal of the 8 route options resulting from the sifting assessment work summarised in Table 4-2. The main environmental features in the area are shown on the Environmental Constraints Plan provided in Appendix B of the Stage 1 EAR. A summary of the cultural heritage assets within the study area for the route and their value / sensitivity is contained in Table 2.2 of the Stage 1 EAR. The criteria as to how the cultural heritage baseline was graded for sensitivity is set out in Appendix C of the EAR. At the time of the

preparation of the Stage 1 EAR, the Design Manual for Roads and Bridges (DMRB) was used as the starting point in respect of determining the value of heritage assets. Table 2.2 reflects the value/sensitivity of cultural heritage receptors that was provided in DMRB at that time .

Table 2.2: Value of cultural heritage receptors

Value / sensitivity	Examples within the study area
High	**Archaeological remains**: One Registered Park and Garden (Croxton Park), 11 Scheduled Monuments (five of which are within 300m of the existing A428, including: the moated enclosure at Wyboston; Tempsford Bridge; the deserted medieval villages at Weald and Croxton; and the moated site at Pond Farm). **Historic buildings**: Seven Grade II* Listed Buildings (three of which are within 300m of the existing A428, including: Croxton Park House, St James Church, Croxton; and the Church of St John the Baptist and St Pandionia).
Medium	**Archaeological remains**: Three archaeological remains including the partially excavated Roman site at Priors Gate, Eltisley Abbey, and St Pandionia's Well. **Historic buildings**: 41 Grade II listed buildings, two non-designated historic buildings (Wintringham Hall and the Old House in Eltisley), and four Conservation Areas (Roxton, St Neots, Croxton and Eltisley).
Low	**Archaeological remains**: 31 remains including partially excavated sites such as the prehistoric ring ditch at Eynesbury (Asset 74) or the possible enclosure at Abbotsley (Asset 103) visible as cropmarks. **Historic buildings**: 13 undesignated historic buildings ranging from small cottages such as the Thatch Cottage in Wyboston (Asset 24) to distinctive local features such as a cast iron mile post in Caxton (Asset 173)

4.4.13 The EAR indicated there were 19 high value cultural heritage assets identified at Stage 1 within the 1km buffer for the whole Scheme. The report also identified there were 41 Grade II listed buildings, including Brook Cottages, and other assets valued as a 'medium-value assets' within the study area. A six point effect scale was used to determine the impact of the options, this is shown in Table 3.3 of the EAR. The Option Appraisal Matrix in Appendix F of the Environmental Assessment Report recorded all 8 route options to have a slight adverse effect or greater. Specifically, the offline dualling with grade separated junctions at Black Cat and Caxton Gibbet roundabouts option was qualitatively assessed to have a slight adverse effect in cultural heritage with a focus on the effects on high value designated sites and archaeological remains along the whole route. The following summaries are extracts from Appendix F of the Stage 1 EAR with consideration of the route options, not specific junctions.

'Designated sites:

There is the potential to adversely impact the setting of two deserted medieval villages at Weald and Wintringham, both of which are scheduled monuments. There is the potential for adverse effects on the setting of a scheduled monument near the junction with the A1198 and a grade II listed farmhouse and barn to the east of Cambridge Road. There is the potential to take traffic (and noise and air quality impacts) away from Croxton Park, which may bring benefits to the setting of this site.

Archaeological remains:

There is a potential for adverse impacts on prehistoric archaeological remains near to the B1046 during construction. There is the potential for unknown archaeology along a predominantly offline route.'

The summary of the environmental appraisal in Table 3.5 of the Stage 1 Environmental Assessment Report in Appendix G identified offline dualling with grade separated junctions at Black Cat and Caxton Gibbet roundabouts option '*to be environmentally preferred offline option as it would provide opportunities for improvement to the NIA, non-motorised user access and to Croxton Park.*'

4.5 Stage 2 – Option selection process

4.5.1 The overarching objectives of PCF Stage 2 – Option Selection is to:

a. Carry out public consultation including exhibitions.

b. Analyse comments received and select a preferred option.

c. Refine the cost estimate for the preferred option (including an allowance for risk).

d. Refine the environmental impact assessment, traffic forecasts and economic benefits following public consultation if required.

e. Produce an outline business case.

f. Announce the preferred route.

4.5.2 The **Table 4-3** summarises the Stage 2 Option assessment activities, confirms the number of route and Black Cat Junction options under consideration at each phase in the process and confirms the relevant reference for reports produced at this stage.

Table 4-3 - Stage 2 Option assessment summary

Timeline	Activity	Outcome	Document Reference
Stage 2 (January 2017 to PRA in Feb 2019)	Develop options ready for Non-Statutory Consultation	3 Route Options	SAR (Section 2.3)
	Further developed Black Cat Junction concept options	3 Route Options plus 12 Black Cat Junction Options	TAR Annex and SAR (Section 2.2) St 2 EAR
	Sift Black Cat Junction Options	3 Route Options plus 3 Black Cat Junction Options	TAR Annex St 2 EAR
	Hold consultation and gather feedback to inform further scheme development	3 Route Options plus 3 Black Cat Junction Options	SAR (Section 8) and Consultation Summary Report

Timeline	Activity	Outcome	Document Reference
	Develop and assess options and identify the preferred option	1 Route Option and 1 Black Cat Junction Option	Preferred Route Announcement (PRA)

4.5.3 Further design development and assessment work for the Black Cat Junction was undertaken in Stage 2. The alignments of twelve high level concept grade separated junction layouts were developed in two dimensions (2D). A range of factors, including existing environmental features and constraints listed below, were considered when developing and assessing the options. The main environmental features are shown on the Environmental Constraints Plan provided in Appendix B of the Stage 2 Environmental Assessment Reports in Appendix J.

a. Existing residential and commercial properties.

b. Crossing of the River Great Ouse and its flood plain.

c. Existing utilities.

d. Environmental and heritage features.

e. Total area of construction.

4.5.4 The twelve junction options developed are described in the Annex to the Technical Appraisal Report (TAR) in Appendix H and are shown in Figures 4.1 to 4.12 in Appendix A. The alternatives included three options (2a, 2b and 4) where parts of the junction extended to the east of the existing Black Cat roundabout.

4.5.5 Based on high-level desk-top data reviews, the viability of each option was assessed with equal weighting for the engineering, environmental, safety, cost and traffic implications. In addition, based on the proposed geometry of the junction, the safety of all the options was assessed based on the number of possible collisions in each movement and how complicated the junction would be to negotiate for road users.

4.5.6 A Red-Amber-Green (RAG) assessment was undertaken for the junction options that considered various project criteria like existing environmental features and constraints such as existing residential properties, the flood plain for the River Great Ouse, sites of archaeological importance / listed buildings affected by options, the safety of the junction defined by the number of possible collisions, existing utilities and the total area of construction. Brook Cottages was one of the cultural heritage sites considered in the assessment. Each option was evaluated against the above assessment criteria. The Black Cat Junction Options Assessment Red Amber Green (RAG) Table is provided at Appendix C, and is reported at Section 5 of the Annex to the Technical Appraisal Report (TAR) in Appendix H.

4.5.7 The Annex to the Technical Appraisal Report (TAR) focuses solely on the options developed for the Black Cat Junction. The environment information and assessment are included in Chapter 5 of the Stage 2 EAR report in Appendix J. A copy of these reports is provided at Appendix G and J respectively.

4.5.8 The Annex to the TAR summarises in Table 10.2:

"*All options have the potential for impacts to a Grade II listed building to the north of Black Cat and potential impacts to unknown buried archaeology*."

4.5.9 **Table 4-4** provides a description of the twelve 2D concept designs assessed, a summary of the effect on Brook Cottages and confirmation of the options recommended to be progressed and those which were discounted at this stage. Costs were not part of the junction assessment at this stage as it was anticipated that all options would be within the cost range of the option estimates undertaken in Stage 1 for the whole scheme and therefore not a defining factor for progressing or discounting.

Table 4-4– PCF Stage 2 Options for Black Cat Junction

Option	Effect on Brook Cottages	Progressed/ Discounted
Option 1a Existing Black Cat Junction relocated to the West with a grade separated dumbbell roundabout junction on Roxton Road. Merge and diverge slip roads provided to both the A428/A421 and A1. **Figure 4.1 in Appendix A**	Would likely have an impact on Brook Cottages with potential demolition required to accommodate the northbound merge to the A1 from the new junction	**Progressed** (in combination with Option 1c) • Accommodates all traffic movements between the A1 and A428/A421 as well as connection to the Bedford Road • Low impact on the flood plain envisaged • Limited safety concerns - High number of design standard relaxations envisaged on the associated slip and link roads but potential to mitigate if combined with Option 1c
Option 1b Existing Black Cat Junction replaced (just to the West of the existing junction) with a grade separated dumbbell roundabout junction. Merge and diverge slip roads provided to both the A428/A421 and A1 **Figure 4.2 in Appendix A**	Would likely have an impact on Brook Cottages with potential demolition required to accommodate the northbound merge to the A1 from the new junction	**Discounted** • Accommodates all traffic movements between the A1 and A428/A421 as well as connection to the Bedford Road • Medium impact on flood plain envisaged level of Very similar option to 1c but with the disadvantage of significant

Option	Effect on Brook Cottages	Progressed/ Discounted
		impact on the Roxton Road over-bridge of the A421 leading to potential for additional disruption to traffic using the A421 during construction • Safety concern - High number of design standard relaxations envisaged on the associated slip and link roads
Option 1c Similar to Option 1b but with a slightly different arrangement for the eastbound diverge and westbound merge with the A421, removing the need to undertake significant works to the existing Roxton Road overbridge of the A421 **Figure 4.3 in Appendix A**	Would likely have an impact on Brook Cottages with potential demolition required to accommodate the northbound merge to the A1 from the new junction	**Progressed** (in combination with Option 1a) • Accommodates all traffic movements between the A1 and A428/A421 as well as connection to the Bedford Road • Medium level of impact on flood plain envisaged, but potential to mitigate impact in combination with Option 1a
Option 1d Existing Black Cat Junction replaced with 2 grade separated junctions and a new link road. • A grade separated dumbbell roundabout junction at Roxton Road provides merge and diverge slip roads to the A428/A421 • A grade separated gyratory junction on the A1 (realigned to the east) provides merge and diverge slip roads to the A1 **Figure 4.4 in Appendix A**	Would likely have an impact on the setting of Brook Cottages but demolition unlikely	**Discounted** • Accommodates all traffic movements between the A1 and A428/A421 as well as connection to the Bedford Road • Safety concern – high number of possible collision points. • Safety concern - Complicated linked junction arrangement which could be confusing for road users • Medium level of impact on flood plain envisaged • Proximity of new junction to Roxton and associated potential impacts on the village, including noise and air quality • High impact on existing services

Option	Effect on Brook Cottages	Progressed/ Discounted
Option 1e Similar to Option 1d but with the grade separated gyratory junction replaced with a grade separated dumbbell junction arrangement to provide merge and diverge slip roads to the realigned A1 **Figure 4.5 in Appendix A**	Would likely have an impact on the setting of Brook Cottages but demolition unlikely	**Discounted** • Accommodates all traffic movements between the A1 and A428/A421 as well as connection to the Bedford Road • Safety concern – high number of possible collision points. • Safety concern - Complicated linked junction arrangement which could be confusing for road users • Proximity of new junction to Roxton and associated potential impacts on the village, including noise and air quality • High impact on existing services
Option 2a Existing Black Cat Junction replaced with two grade separated dumbbell roundabout junctions on the A421 (west of the A1 at Roxton Road) and A428 (to the east of the A1) with associated link roads providing merge and diverge slip roads to the A1. **Figure 4.6 in Appendix A**	Would likely have an impact on Brook Cottages with potential demolition required to accommodate the northbound merge to the A1 from the new junction	**Discounted** • Accommodates all traffic movements between the A1 and A428/A421 as well as connection to the Bedford Road • Safety concern – high number of possible collision points. • Safety concern - Complicated two junction arrangement which could be confusing for road users • Proximity of new junction to Roxton and associated potential impacts on the village, including numerous listed buildings • Extends further to the east of the A1 and significant construction required resulting in a high level of impact on the River Great Ouse floodplain

Option	Effect on Brook Cottages	Progressed/ Discounted
Option 2b Similar to Option 2a but with the two grade separated dumbbell junctions replaced with two grade separated gyratory junctions, including a roundabout to the east of the A1. **Figure 4.7 in Appendix A**	Would likely have an impact on Brook Cottages with potential demolition required to accommodate the northbound merge to the A1 from the new junction	**Discounted** • Accommodates all traffic movements between the A1 and A428/A421 as well as connection to the Bedford Road • Safety concern – high number of possible collision points. • Safety concern - Complicated two junction arrangement which could be confusing for road users • Proximity of new junction to Roxton and associated potential impacts on the village, including noise and air quality • Extends further to the east of the A1 and significant construction required resulting in a high level of impact on the River Great Ouse floodplain
Option 3a Single grade separated gyratory junction between the A421/A428 and a realigned A1(realigned to the east of the existing Black Cat Junction). **Figure 4.8 in Appendix A**	Would likely have an impact on Brook Cottages with potential demolition required to accommodate the northbound merge to the A1 from the new junction	**Discounted** • Accommodates all traffic movements between the A1 and A428/A421 as well as connection to the Bedford Road • Medium level impact on flood plain envisaged • Very similar option to 3b but with the disadvantage of significant impact on the Roxton Road over-bridge of the A421 leading to potential for additional disruption to traffic using the A421 during construction
Option 3b Similar to Option 3a but with a slightly different arrangement for the eastbound diverge and westbound merge with the	Would likely have an impact on Brook Cottages with potential demolition required to	**Progressed** • Accommodates all traffic movements between the A1 and A428/A421 as well as

Option	Effect on Brook Cottages	Progressed/ Discounted
A421, removing the need to undertake significant works to the existing Roxton Road overbridge of the A421 **Figure 4.9 in Appendix A**	accommodate the northbound merge to the A1 from the new junction	connection to the Bedford Road • Conventional junction arrangement that should not be confusing for road users • Low number of potential collision points • Medium level impact on flood plain envisaged
Option 4 Existing Black Cat Junction replaced with a fully free-flowing junction between the A428/A421 and the A1, which is realigned and extends further to the east of the A1, utilising a series of link roads. **Figure 4.10 in Appendix A**	Would likely have an impact on Brook Cottages with high potential for demolition to accommodate the free flow links leading to the northbound merge to the A1	**Discounted** • Accommodates all traffic movements between the A1 and A428/A421, but local traffic access from Bedford Road is not maintained • Safety concern - High number of design standard relaxations envisaged on the associated slip and link roads • U-turn manoeuvres not accommodated by junction • Large construction footprint • Greater impact on the Noise Important Area on the A1 at Chawston • Extends further to the east of the A1 and significant construction required resulting in a high level of impact on the River Great Ouse floodplain • High impact on existing services
Option 5 Existing Black Cat Junction replaced with a partial movement free-flow junction between the A428/A421 and the A1, which is realigned to the east, utilising a series of link roads. **Figure 4.11 in Appendix A**	Would likely have an impact on Brook Cottages with potential demolition required to accommodate the northbound merge to the A1 from the free-flow link from the A421	**Progressed** (with modifications required to address some identified issues) • Low number of potential collision points • Small construction footprint and primarily positioned away from existing housing

Option	Effect on Brook Cottages	Progressed/ Discounted
		• Does not accommodate all traffic movements between the A1 and A428/A421 but caters for the movements predicted to be in highest demand. Addition of elements of Option 6 design mitigates
Option 6 Existing Black Cat Junction and A1 alignment maintained with addition of A421 merge and diverge slip roads to accommodate new A428 connection. Free-flow links added from the A421 eastbound to A1 northbound and A1 southbound to A428/A421 westbound **Figure 4.12 in Appendix A**	Would likely have an impact on Brook Cottages with potential demolition required to accommodate the northbound merge to the A1 from the free-flow link from the A421	**Discounted** (some junction elements taken forward in Option 5 to address some of the issues identified) • Does not accommodate all traffic movements between the A1 and A428/A421 and only partially caters for the movements predicted to be in highest demand • Does not offer an improvement to the A1 and traffic all A1 traffic would be required to continue to use the existing Black Cat Junction • Low impact envisaged on the River Great Ouse floodplain • Only some U-turn manoeuvres accommodated by junction

4.5.10 The assessment for the effect on Brook Cottages was based on the conceptual 2D layouts. The assessment determined that all options potentially impacted on Brook Cottages and concluded that demolition would likely not be required for Options 1d and 1e. But these options would likely have had an impact on the setting of the cottages. Demolition would likely not be required for these two options on the basis that the junction operation had been split into two with the A1 interface element being located south and east of the existing junction. With this location, the northbound merge slip road on to the A1 is also located further south and east, when compared to other options. However, Options 1d and 1e were both discounted because of safety concerns. With both options there are a high number of road interfaces, leading to a high number of potential collision points, and the junction layouts are complicated leading to the high potential for road user confusion further increasing the threat of collisions.

4.5.11 All other options were assessed as having the potential to require demolition of Brook Cottages. This is due to the requirement for a northbound merge slip road onto the A1 to accommodate the A428/A421 to A1 (northbound) movement. The 2D concept designs were developed to a level proportionate with a sifting exercise. It is only with further design development that it could be determined whether demolition would or would not be required.

4.5.12 The three junction options with layouts that extended to the east of the existing Black Cat junction were all discounted at this assessment stage. Options 2a and 2b were discounted on safety and technical grounds, as set out in Table 4 1. For both options, a high number of possible collision points were identified as well as a complicated alignment which would be confusing for road users. They had also potential significant environmental impacts, especially for the effects on the River Great Ouse flood plain. Option 4 was also discounted on safety and technical grounds, the free-flow link and slip roads were likely to require a high number of design standard relaxations. It also had the potential for significant environmental impacts due to the large construction footprint and effects on the River Great Ouse flood plain.

4.5.13 As a result of the assessment of the 12 Black Cat Junction options, the three shortlisted options were:

a. Option 1a/c

b. Option 3b

c. Option 5 (with the adoption of some elements from Option 6)

4.5.14 A combination of options 1a and 1c were taken forward as it allowed for all manoeuvres and provided connection to the junction for Bedford Road. Option 3b also facilitated all the manoeuvres, but Option 1a/c provided a direct connector road between the A428 eastbound and A1 northbound which had the highest traffic movements at this junction.

4.5.15 Option 3b due to its alignment, was considered to be the safest option as it would not require any relaxations or departures in the design and minimum sight stopping distance was achieved on all the connector roads. It also had a lower number of possible collision points compared to option 1a/c.

Option 5 accommodated the major traffic movements although minor traffic movements were diverted through other junctions. It required one bridge structure which was the lowest number among all the options.

4.5.16 These three options were taken forward into the non-statutory consultation, undertaken in PCF Stage 2. The three options were renamed:

a. Option 1a/c became Option A.

b. Option 5 became Option B.

c. Option 3b became Option C.

The Applicant considered these alternatives best met the scheme objectives, solved the traffic problems as they either accommodated all traffic movements or were safe with a low number of collision points and offered reasonable

environmental alternatives as there was either less impact in the flood plain or there was a low number of residential properties in the construction area.

4.5.17 The Applicant undertook non-statutory public consultation from March 2017 to April 2017 and presented three route options and three Black Cat junction options. The Applicant consulted with Bedford Borough Council and Historic England on the Black Cat junction options through the non-statutory public consultation.

4.5.18 The Black Cat junction options were presented as concept design layouts in the non-statutory consultation brochure **[APP-035]**. The brochure included an environmental comparison of the options, which stated that Option A "may affect the setting of the listed building to the north of the Black Cat roundabout" (so may have avoided Brook Cottages) and Options B and C "may result in the removal of the Grade II listed building to the north of Black Cat roundabout".

4.5.19 Of the 4189 responses that were received, 3718 responded with a preference on the Black Cat roundabout options. 2538 respondents expressed a preference for 1 of the 3 Black Cat options. Consultation Option C received the most support from respondents with 1533 of the 2538 (60%) expressing it as their preferred option. Those who supported this option, believed that it would create free-flowing traffic at the Black Cat, alleviating traffic and congestion problems at the junction. Those who supported Option C also mentioned, amongst others, the following reasons for their support:

a. It would provide the necessary capacity and flexibility to cope with any future increases in traffic or road use.

b. Least impact on residents.

c. It would be the most cost-effective option as it would not need further modification.

d. It would have the least impact on the local environment and the surrounding area.

e. It would be a simple solution that is less confusing.

4.5.20 Respondents expressed concerns that the construction of Option C would not permit free-flowing traffic from the northern stretch of the A1 towards Bedford. Those who had concerns about Option C also mentioned, amongst other things, the following concerns:

a. Would increase congestion around the roundabout.

b. Would be an imposing three-tiered roundabout that would have a visual impact.

c. Would involve the removal of a Grade II listed building: Brook Cottages.

A few respondents, including Toseland Parish Council, expressed concerns for heritage sites surrounding the Black Cat roundabout, which they feared would be affected by the construction of Option C. This included the removal of the Grade II listed Brook Cottages, which some respondents believed should not be

impacted unless National Highways could prove that the Scheme is necessary for '*substantial public benefits'*.

4.5.21 Bedford Borough Council responded to the consultation in support of Option C, which was one of the options that "may result in the removal of the Grade II listed building to the north of Black Cat roundabout" . Historic England did not respond to the non-statutory consultation with any comments.

4.5.22 The Applicant received one response from a member of the public to the non-statutory public consultation regarding Black Cat junction that presented four conceptual alternative layouts for the Black Cat Junction. All the options had the circulatory roundabout located to the east of the existing junction. The alternative proposals were given full consideration and a response provided. The Applicant's response explained that all four proposals would have a more significant impact upon the River Great Ouse flood plain, were more complex to navigate, required considerably more new structures, increased land take and would have demolished one other property and led to 12 others losing vehicular access to their property. Only one alternative option provided a link to Bedford Road and the local road network. Access from the A1 southbound service area may also have been lost. The four alternative layouts would have resulted in the demolition of Brook Cottages and Greenacres to the south of the Black Cat junction. The alternative layouts were not taken forward for the reasons identified above. The Applicant's response to these alternative layouts concurs with the detailed response provided to Action Point 4 from Issue Specific Hearing 1 **[REP1-034]** about the criteria considered in the assessment of alternatives for the Black Cat Junction and alignment of the A1 in the immediate and wider area.

4.5.23 The Applicant received no other alternatives/suggestions from the non-statutory public consultation regarding Black Cat junction or the retention of Brook Cottages; as shown in 'Section 8 – Alternative options received as part of the feedback' of the Report on Public Consultation, Appendix B16 of the Consultation Report **[APP-035].**

4.5.24 Option A was an option which was consulted on which was not expected to require demolition of Brook Cottages at that stage, but respondents expressed a preference for Option C which was considered likely to require demolition. Option B presented an arrangement to the east of the existing Black Cat roundabout where the junction slip roads were located more in the River Great Ouse flood plain as has been suggested by the Examining Authority. However, and notwithstanding the alignment to the east, Option B was one of the options reported to potentially have a direct effect on Brook Cottage in the non-statutory consultation booklet **[APP-035]**. It was the least preferred option at non-statutory consultation and the junction did not provide an eastward connection for vehicles travelling to and from the A1.

4.5.25 The Stage 2 EAR in Appendix J assessed the potential effects associated with each of the three options. Cultural heritage was given equal weighting to all other environmental criteria. The assessment concludes that all options are likely to have similar significant effects on the environment, with the key effects relating to impact on the flood plain, nature conservation, landscape and cultural heritage. Brook Cottages was one of 6 Grade II listed buildings in the study area for the

Black Cat junction. The summary of the qualitative environmental assessment included the same conclusion for all three options "*There is potential for significant impacts to a grade II listed building to the north of Black Cat and potential impacts to unknown buried archaeology*". The summary in the EAR indicated the impact of the River Great Ouse flood plain was more significant:

"The River Great Ouse is the most sensitive environmental part of the scheme identified to date, and it is likely that mitigation measures will include floodplain compensation and ecological mitigation in this area. There is likely to be significant effects associated with Black Cat in terms of the noise and visual aspects."

4.5.26 Following the non-statutory public consultation, the alignments of these three options were further developed, including 3D alignment development, to identify any further constraints, if any, to their viability and buildability. General arrangement layout drawings for the three junction options, including the outline earthworks design, are provided in the Annex to the TAR in Appendix H and Scheme Assessment Report in Appendix K and are also shown in Figures 4.13 to 4.15 at Appendix B. The general arrangement layout drawings show that all three options would potentially require the demolition of Brook Cottages due to the extent of the earthworks and construction area.

4.5.27 An Option Comparison Table (Table 10.2) in the Scheme Assessment Report concluded that only Options A and C fully address the Scheme objectives, whereas Options B and C+ only partially address the Scheme objectives. A copy of the Scheme Assessment Report is provided in Appendix K.

4.5.28 The Scheme Assessment Report explained that Brook Cottages may be adversely impacted by all the Black Cat Junction Options.

"*There is a Listed Building that lies close to Black Cat junction, which is likely to be affected by all of the Black Cat options, and potentially to the point of removal depending on how the slip roads connect to the A1."*

4.5.29 The Scheme Assessment Report has details of the Scheme costs included in the assessment of the route and Black Cat Junction options at Section 5.4.2, Scheme Costs and Table 10.2, Option Comparison Table.

4.5.30 As set out in the Black Cat Junction Design Options **[APP-247]** and Para 4.2.25, following non-statutory consultation the Applicant undertook a more detailed assessment of the three options at Black Cat to assess the potential impact of each junction option on Brook Cottages. This assessment confirmed that all three options may require the demolition of Brook Cottages in order to design the new free flow continuous link from the A421 eastbound towards the A1 northbound and the new A1 northbound merge slip road that are compliant with national highway safety and design standards. As such, the Applicant sought to develop a variation of the Option C design with the specific aim of retaining Brook Cottages, whilst still delivering the Scheme objectives. The arrangement was referred to as Option C+. It was determined that although Option C+ did not require the demolition of Brook Cottages, it presented unacceptable changes to the road geometry in the surrounding area, impact on safety because of the increased potential for accidents, poor operational resilience and was significantly more

expensive. Details of this are included in the Black Cat Junction Design Options report **[APP-247]**. It was therefore not possible to take Option C+ and the retention of Brook Cottages forward.

4.6 Stage 3 – Scheme development to preliminary design

4.6.1 The overarching aim of objectives of PCF Stage 3 – Preliminary Design is to:

a. If early contractor involvement procurement method selected, appoint contractor.

b. Carry out surveys (such as topographical, geotechnical, environmental).

c. Undertake consultation, complete consultation report and resolve or rebut outstanding issues.

d. Complete and freeze the preliminary design of the preferred route.

e. Prepare orders (Planning Act 2008 or Highways Act 1980) as appropriate.

f. Complete the environmental assessment and prepare the environmental statement.

g. Agree initial target cost with Early Contractor Involvement (ECI) contractor (if applicable).

4.6.2 In June 2019, the Applicant undertook statutory public consultation for which Bedford Borough Council and Historic England were prescribed consultees. On 31 May 2019, the Applicant wrote to the prescribed consultees and encouraged the respective parties to share their views. Bedford Borough Council did not raise opposing comments or concerns regarding the demolition of Brook Cottages. Historic England did not provide feedback during the consultation.

4.6.3 Of the 440 respondents to the Statutory Consultation 308 strongly supported, and a further 84 supported, the design of Black Cat junction. Of the 18 respondents opposed to the design, 11 sought to increase the scope, and further increase land take. Toseland Parish Council sought confirmation "that there is no way to preserve the two 18th century cottages near the Black Cat roundabout". The Cambridgeshire and Peterborough Combined Authorities commented "The PEI Report ignores the impact in the Scheme on the known extensive archaeological resource in the Construction column, which deals solely with the demolition of Brook Cottages and the removal of a milestone at Eltisley". The response from Bedford Borough Council confirmed their support for the Scheme and the Black Cat Junction Option C.

"*Bedford Borough Council has offered full support for many years for improvements in various forms to this stretch of road, and we are pleased to continue that support through this stage of the consultation process for the orange route, and junction arrangement 'C'.*"

4.6.4 In February 2020, the Applicant received a late response to the statutory consultation from Historic England. The response raised concerns in relation to the potential for complete loss of Brook Cottages and suggested that the Applicant explore the option to relocate the timber frame. Historic England did not

propose or suggest an alternative junction arrangement to avoid direct impacts on Brook Cottages.

5 Conclusion

5.1.1 The Examining Authority is seeking evidence regarding the reasonable alternatives considered at Black Cat junction to understand how Brook Cottages was considered in the option identification and selection process. As set out, there was early consideration of options for a new junction at Black Cat which were considered against a number of criteria, including environmental impact, in order to inform a shortlist to take forward to non-statutory consultation.

5.1.2 Whilst cultural heritage was not a specific Scheme objective, minimising impacts on cultural heritage was recognised as a benefit of the improved environment Scheme objective at non-statutory consultation. As demonstrated above, in the consideration and assessment of alternative options, cultural heritage was given full and equal weight to all other criteria, whether environmental or technical (including for example safety considerations, cost considerations, etc). The Applicant also continued to seek to minimise and avoid heritage impacts post PRA during the further development of the Scheme. One example of this is the development of the variant Option C+ , specifically, to try and avoid the loss of Brook Cottages **[APP-247]**.

5.1.3 In the early stages of Scheme development, options were developed which sought to avoid impacts on built heritage (including Brook Cottages), and therefore heritage criteria considered the number of heritage assets potentially affected, as opposed to whether there was a direct or indirect impact on those assets. At this stage, all options affected similar numbers of heritage assets, and therefore cultural heritage was not a determining factor.

5.1.4 As the Scheme evolved, it became clear that some junction options would likely have a direct impact on Brook Cottages with potential to lead to its loss, as explained in the description and assessment of the twelve concept designs for the Black Cat Junction summarised in Table 4.4.

5.1.5 Of the twelve options considered, two options were identified where it was thought that a direct impact could be avoided on Brook Cottages (Options 1d and 1e). However, those two options had unacceptable safety implications, and were discounted for that reason (amongst other reasons). Other options were discounted for unacceptable safety reasons or because of their similarities to preferable options already being taken forward, but all of these options were considered to have the potential to require demolition of Brook Cottages.

5.1.6 Ultimately, three junction options were taken forward to non-statutory consultation. On developing these options further, it was thought that one option (Option A) would avoid direct impacts on, and the loss of, Brook Cottages. Option A was consulted on as part of the non-statutory consultation in advance of PRA as described in the Options consultation and PRA booklet **[APP-035].**

5.1.7 The preferred option at non-statutory consultation (Option C) was not the option which was thought to avoid direct impacts on Brook Cottages at that time (which was Option A). All three non-statutory options were re-assessed following non-statutory consultation and it became clear that all three options would be likely to

require the removal of Brook Cottages, and the preferred option (Option C) was taken forward at PRA.

5.1.8 However, due to some concerns raised on the loss of Brook Cottages at non-statutory consultation, further attempts were made to modify the preferred option to avoid impacts on Brook Cottages (through the development of the variant Option C+). However, it was not possible to do so due in particular due to unacceptable safety and technical issues **[APP-247]**.

5.1.9 Accordingly, there is no reasonable alternative to the Scheme which would avoid direct impacts on, and the loss of, Brook Cottages and all reasonable alternatives have been fully considered by the Applicant.

5.1.10 The Applicant acknowledges the demolition of Brook Cottages will result in a significant adverse effect and substantial harm, but this is necessary in order to deliver the Scheme objectives and the substantial public benefits of the Scheme which are considered to outweigh the harm to Brook Cottages as explained in the Case for the Scheme **[APP-240]**.

Appendix A – Black Cat Junction Conceptual Design Option Sketches

Figure 4- 1 - Option 1a

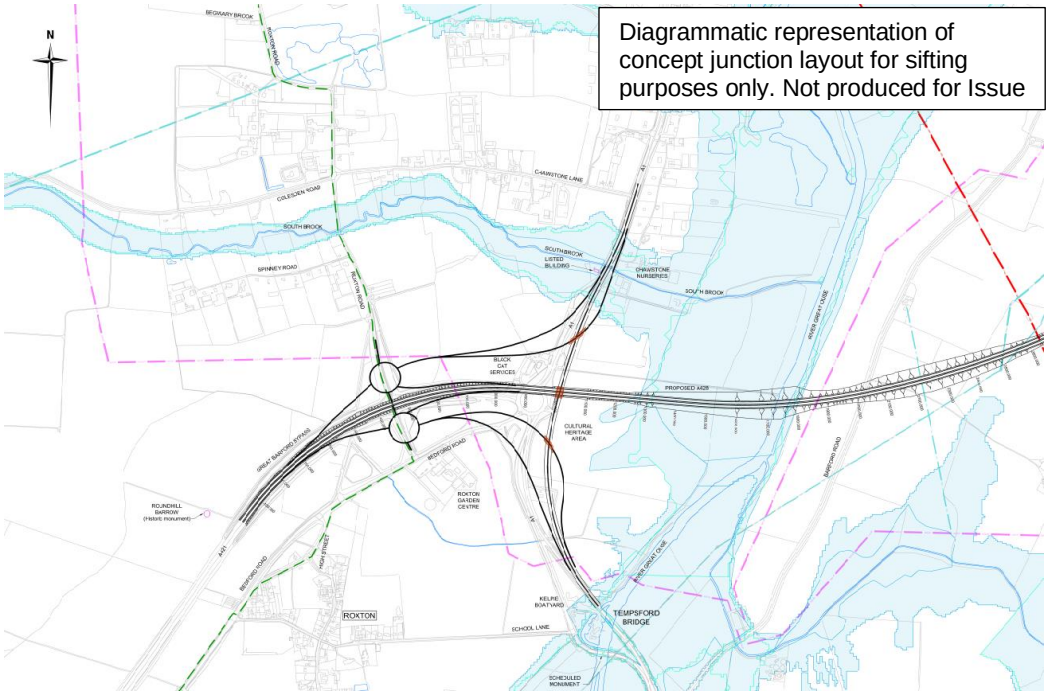


Figure 4- 2 - Option 1b

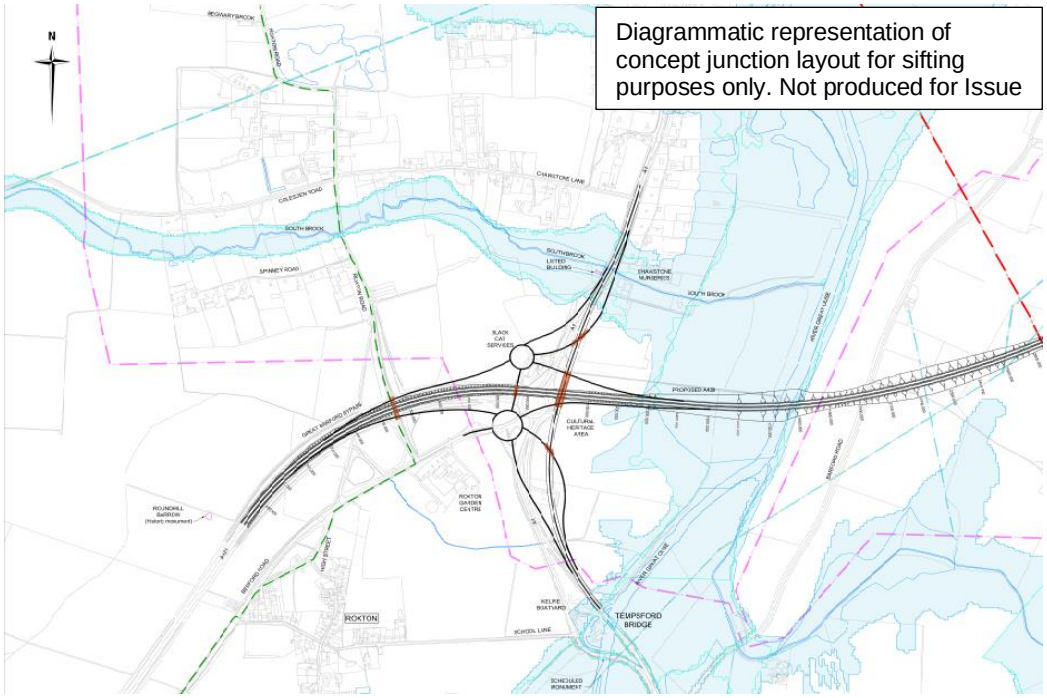


Figure 4- 3 - Option 1c

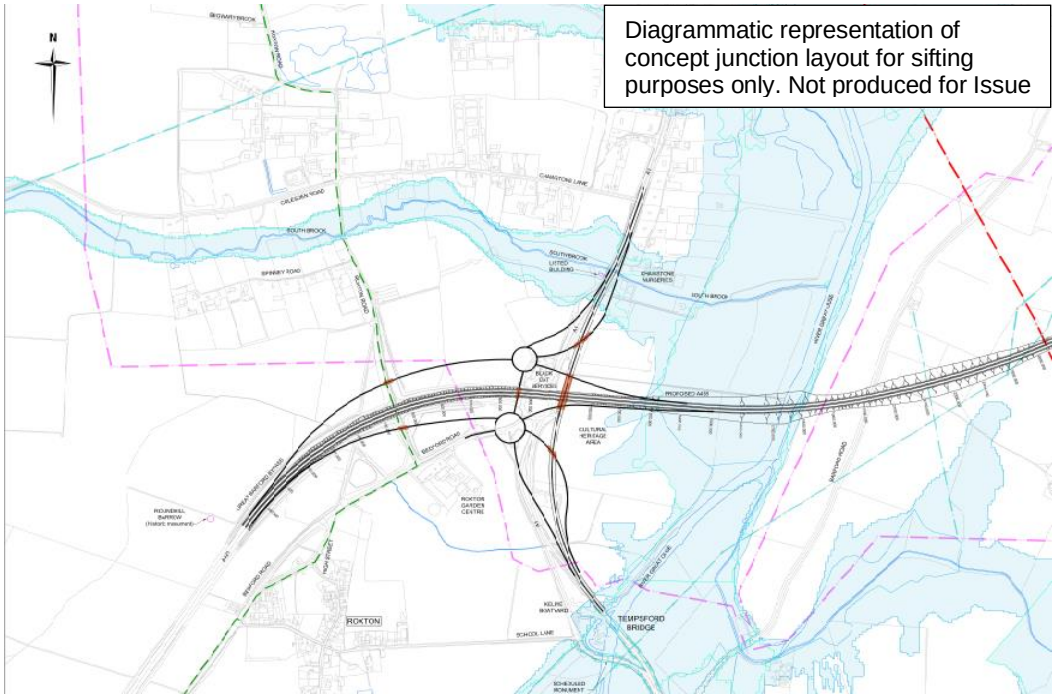


Figure 4- 4 - Option 1d

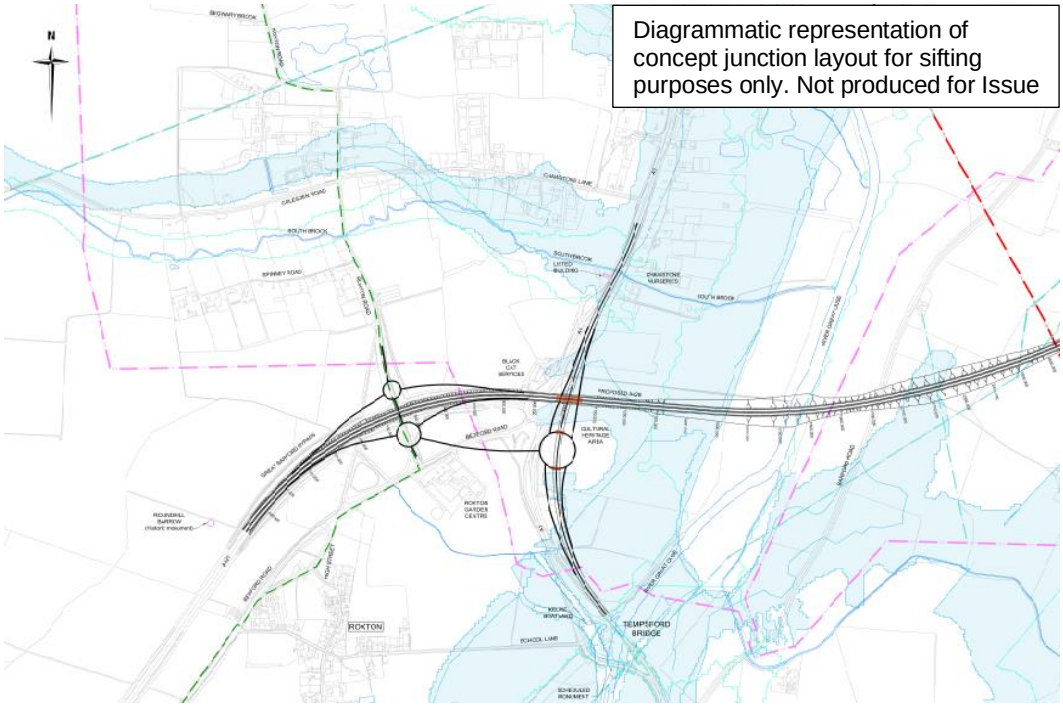


Figure 4- 5 - Option 1e

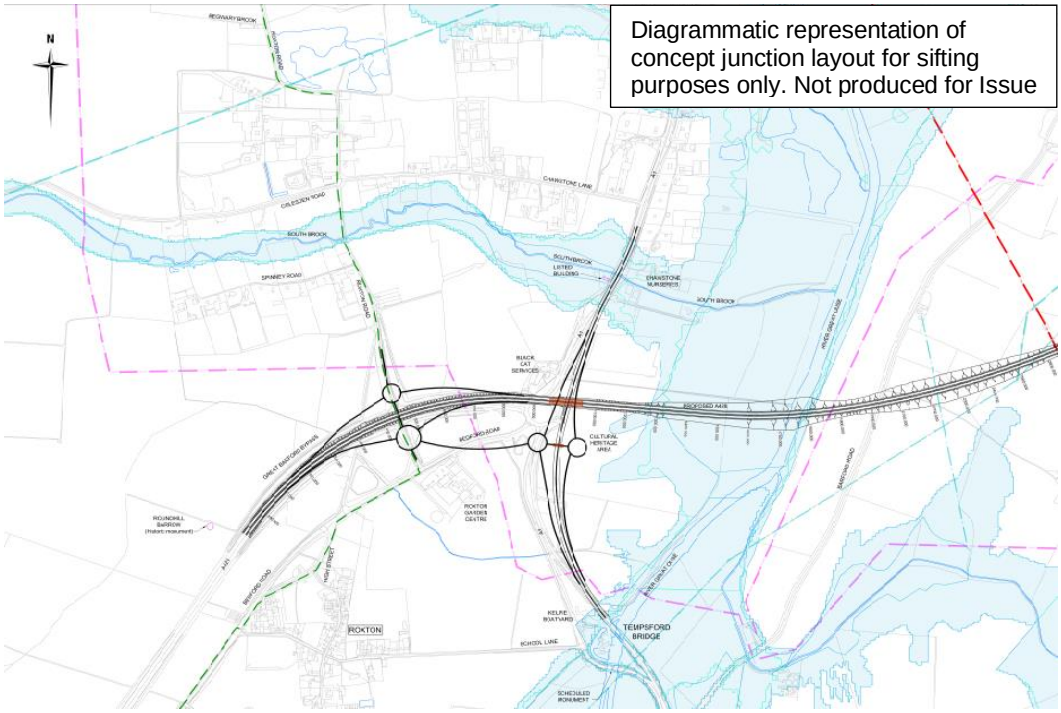


Figure 4- 6 - Option 2a

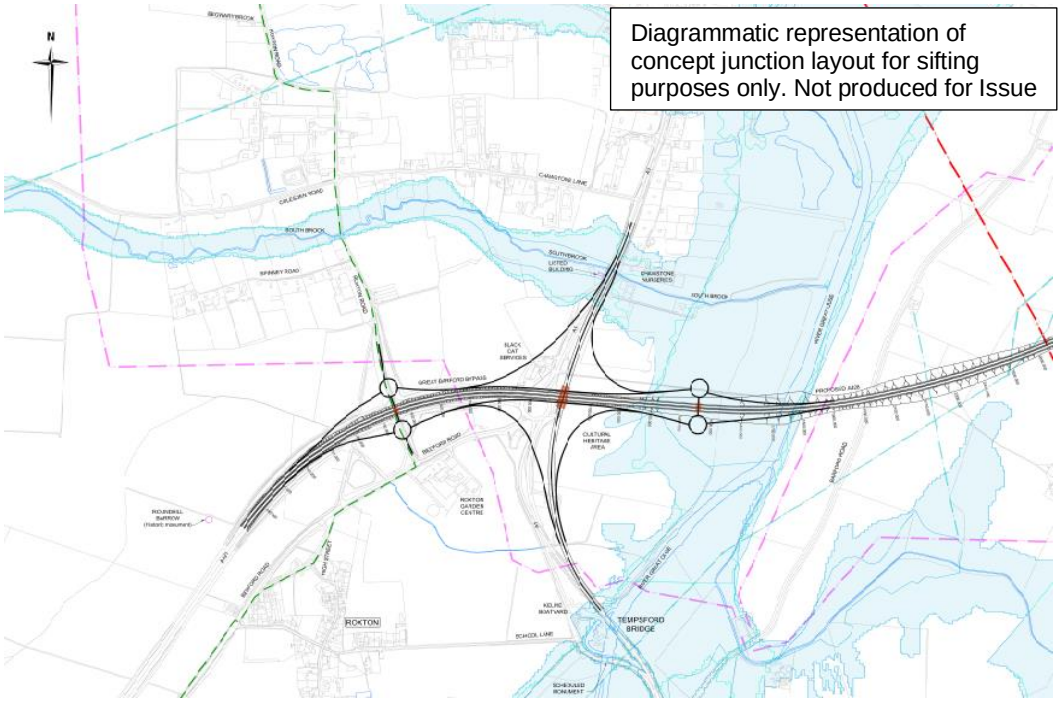


Figure 4- 7 - Option 2b

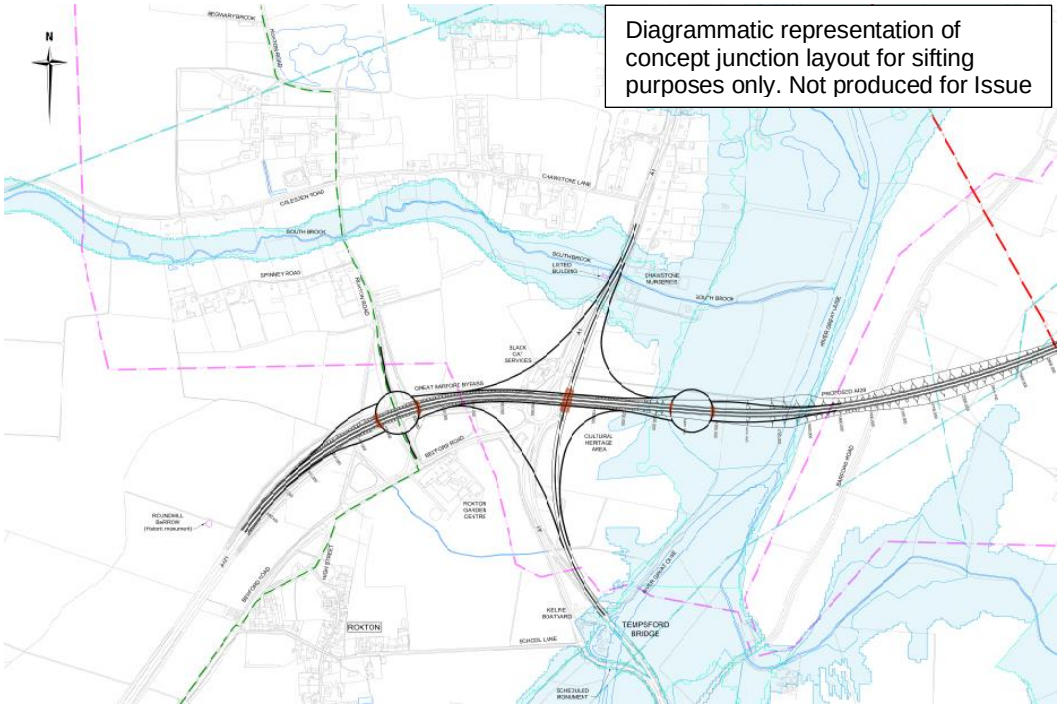


Figure 4- 8 - Option 3a

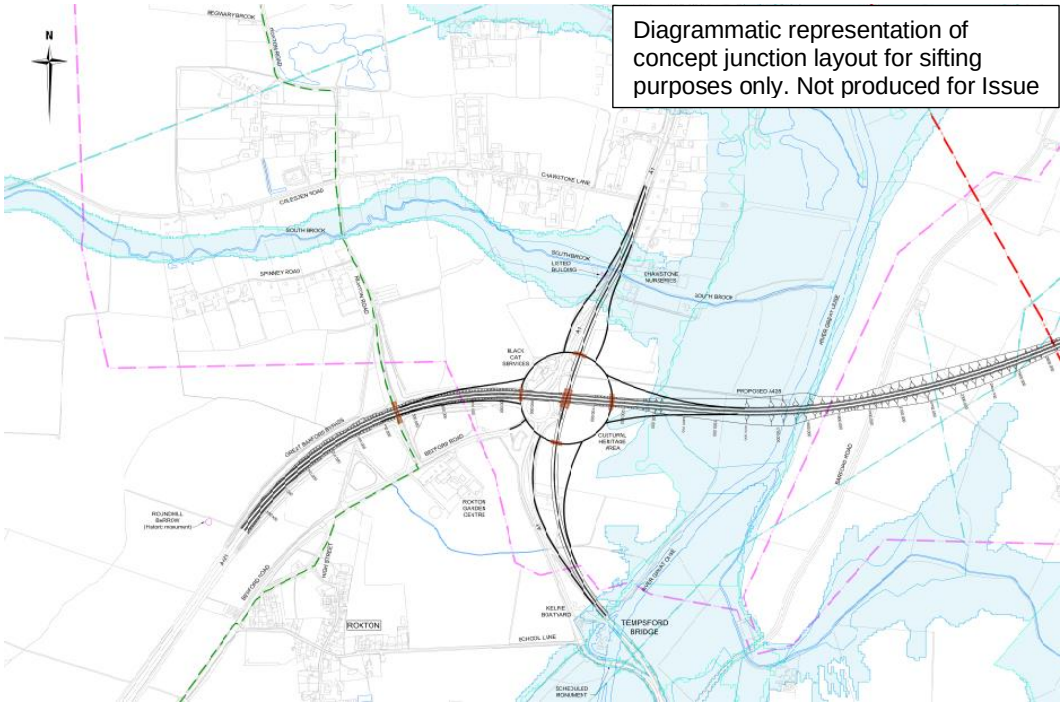


Figure 4- 9 - Option 3b

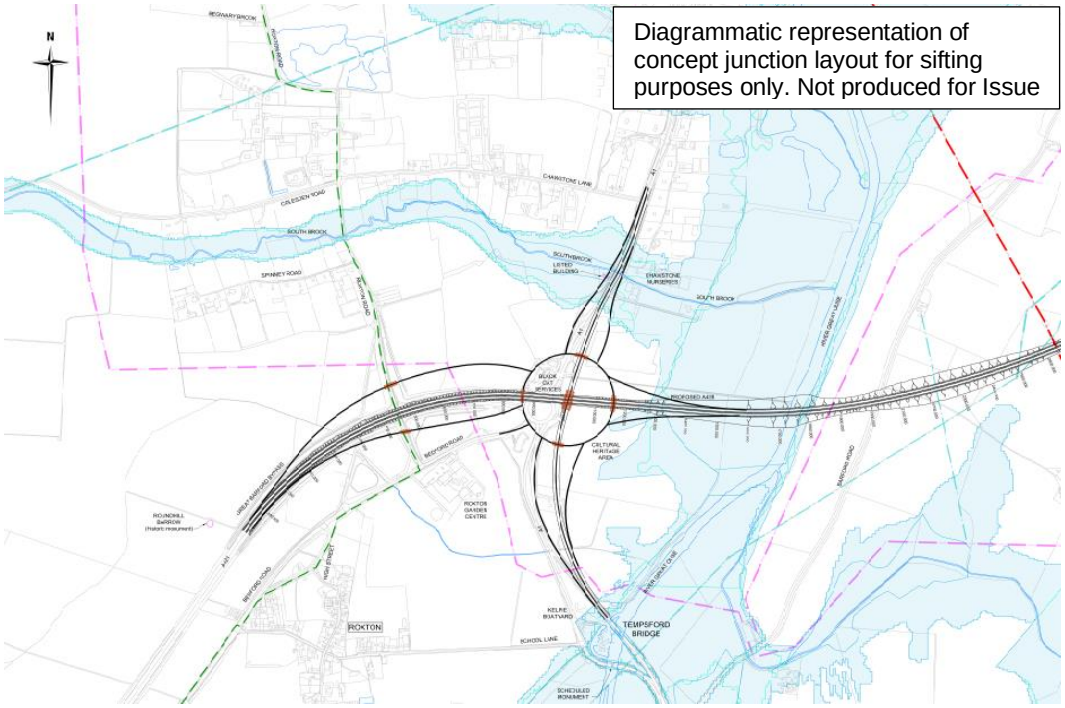


Figure 4- 10 - Option 4

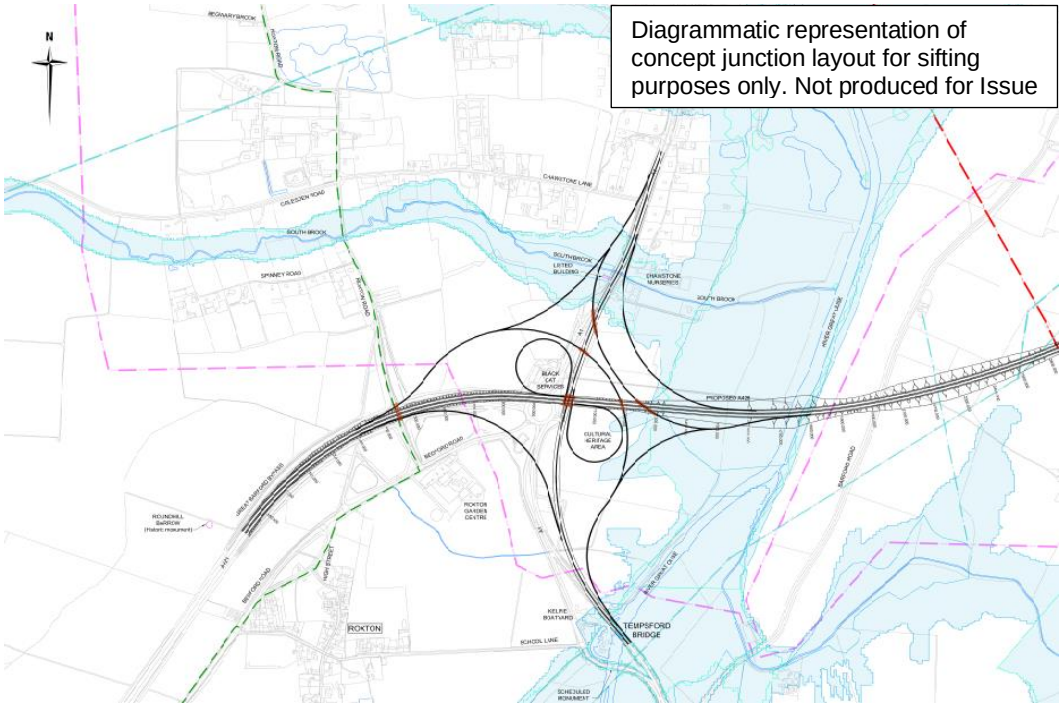


Figure 4- 11 - Option 5

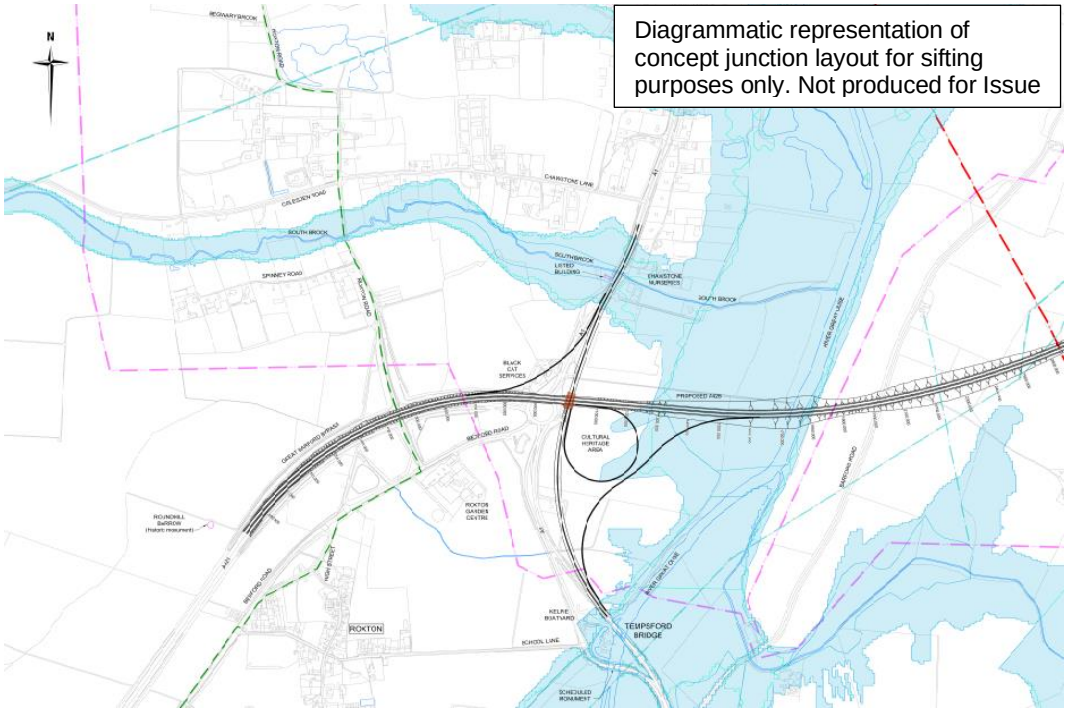
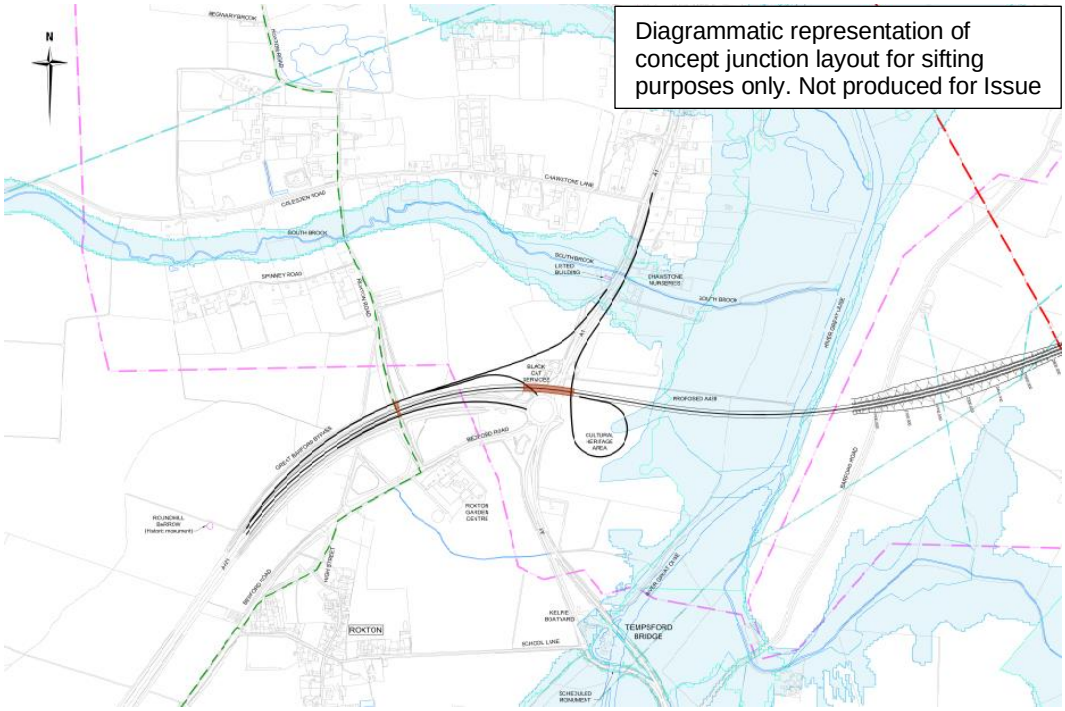


Figure 4- 12 - Option 6



Appendix B – Black Cat Junction Option General Arrangements (3D design)

Figure 4- 13 - Option A

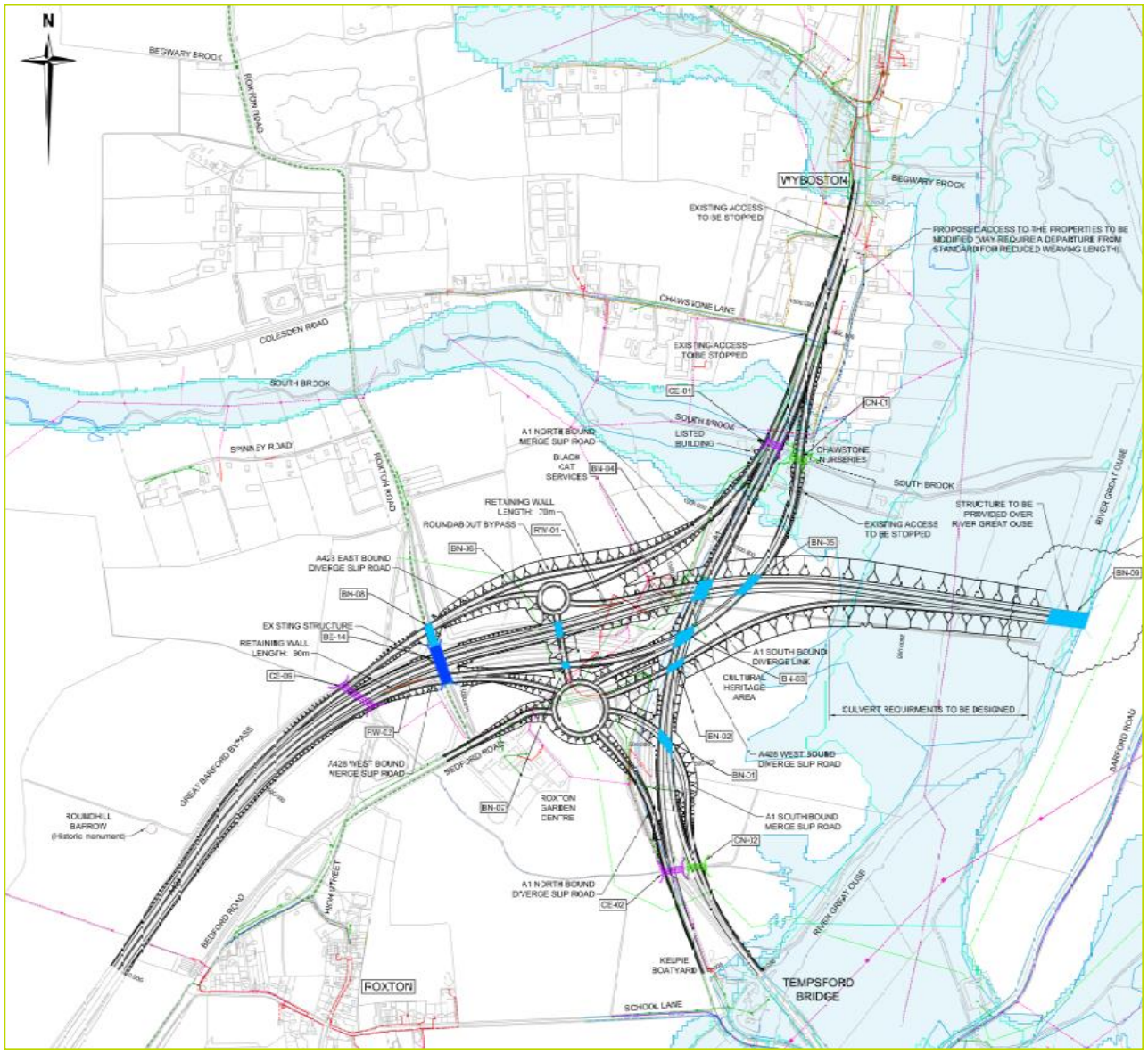


Figure 4- 14 - Option B

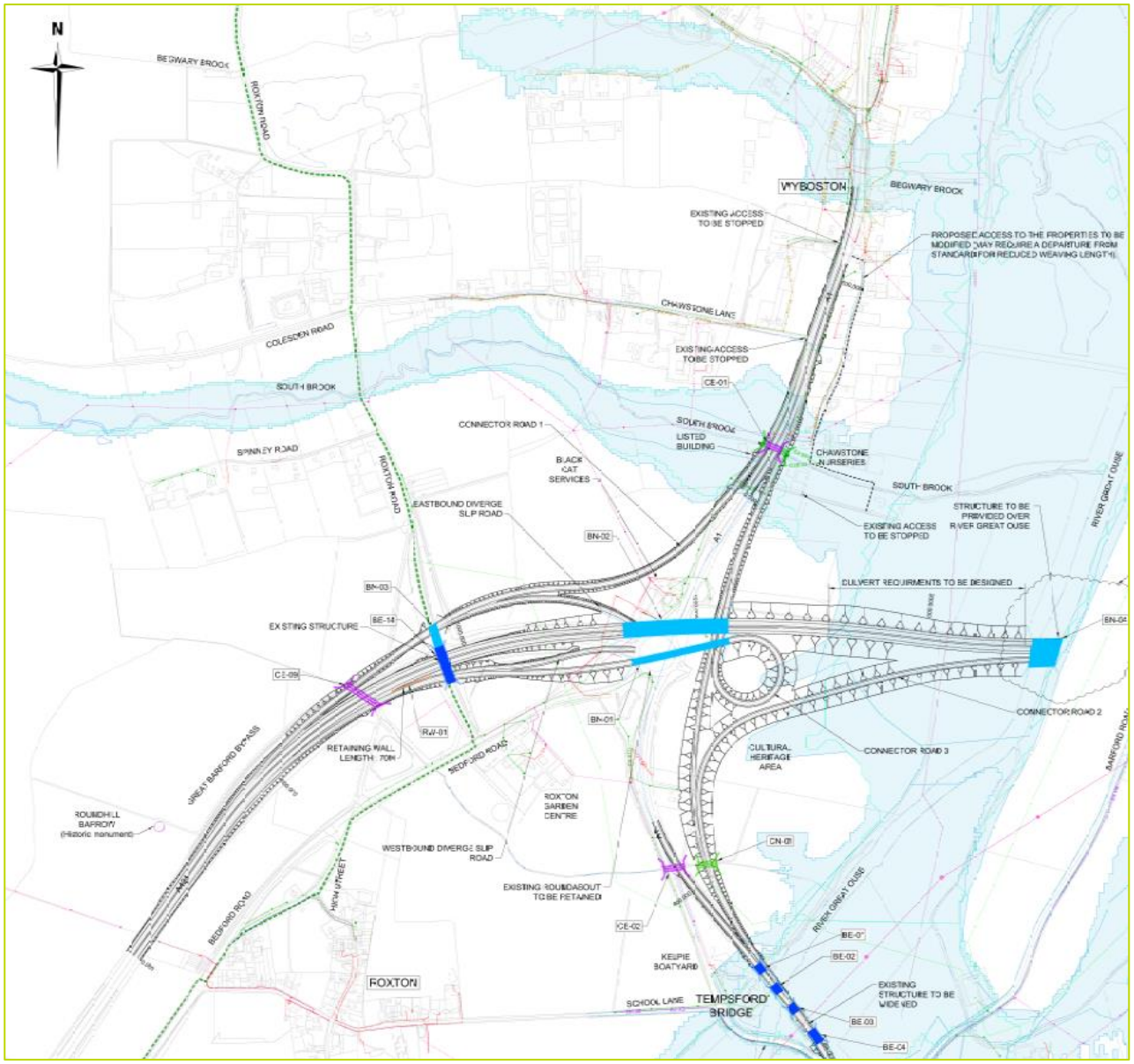
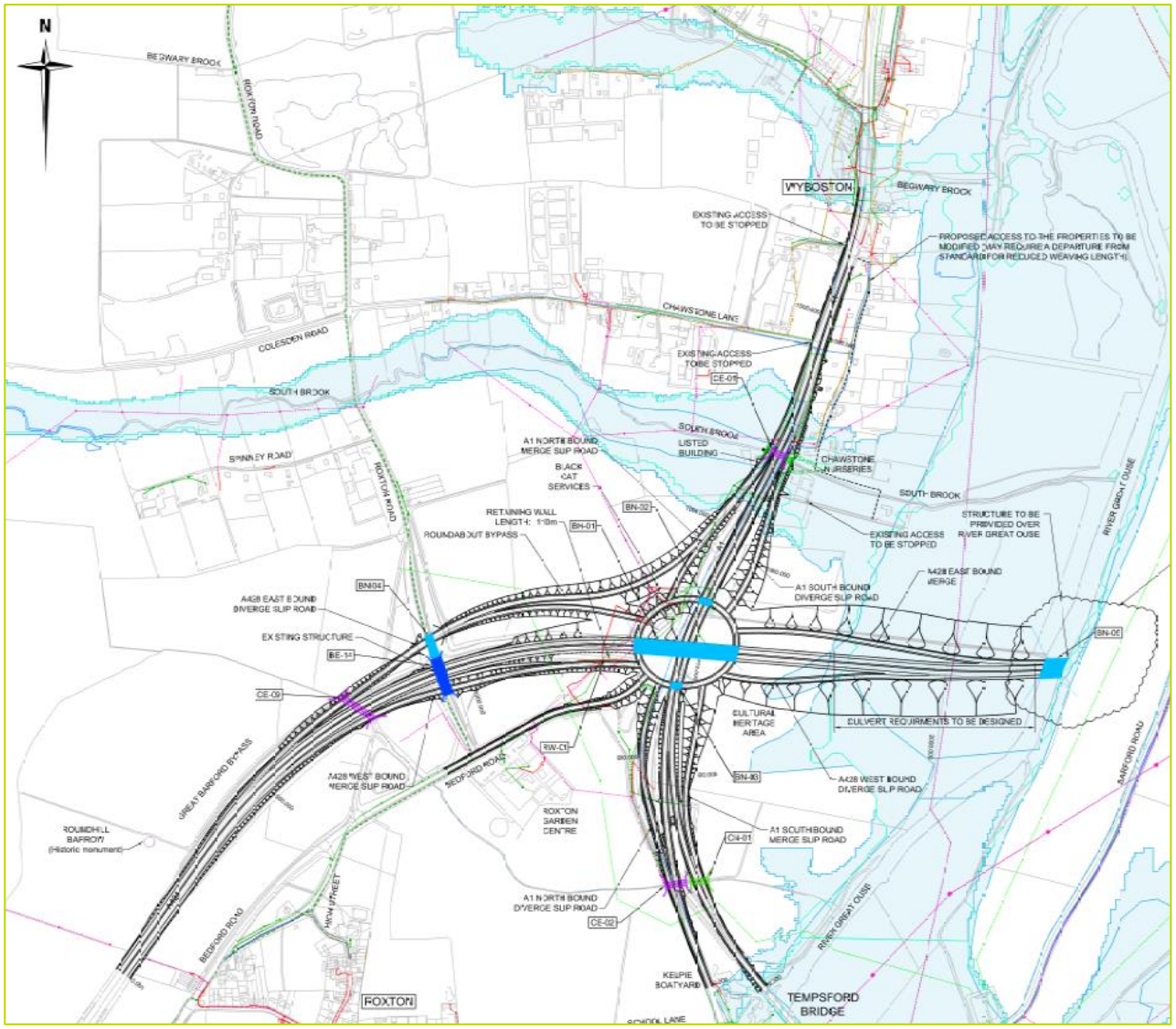


Figure 4- 15 - Option C



Appendix C – Black Cat Junction Options Assessment Red Amber Green (RAG) Table

Black Cat Junction													
Assessment approach : Proportionate assessment for the stage of Scheme development and for sifting purposes only													
	Option 1a	**Option 1b**	**Option 1c**	**Option 1d**	**Option 1e**	**Option 2a**	**Option 2b**	**Option 3a**	**Option 3b**	**Option 4**	**Option 5**	**Option 6**	**Assumptions**
1. Are all traffic movements between A428-A1 catered for within the junction? (Y/N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Green = Y Red = N
2. If not, how far are the diversions (m)?													
A1 NB > A428 WB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	6km diversion via existing A1 to Wyboston junction, then double back and take A1 SB > A428 WB diverge	N/A	Green = N/A Amber = Facilitated through another junction Red = Diversion
A1 NB > A428 EB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	9km diversion via existing A1, A428 and join at proposed Cambridge junction	9km diversion via existing A1, A428 and join at proposed Cambridge junction	
A1 SB > A428 WB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
A1 SB > A428 EB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No but can join the A428 at proposed Cambridge Road junction via Wyboston and Existing A428	No but can join the A428 at proposed Cambridge Road junction via Wyboston and Existing A428	
A428 WB > A1 NB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No but can continue on the existing A428 from the proposed Cambridge Road junction and join A1 at Wyboston junction	No but can continue on the existing A428 from the proposed Cambridge Road junction and join A1 at Wyboston junction	

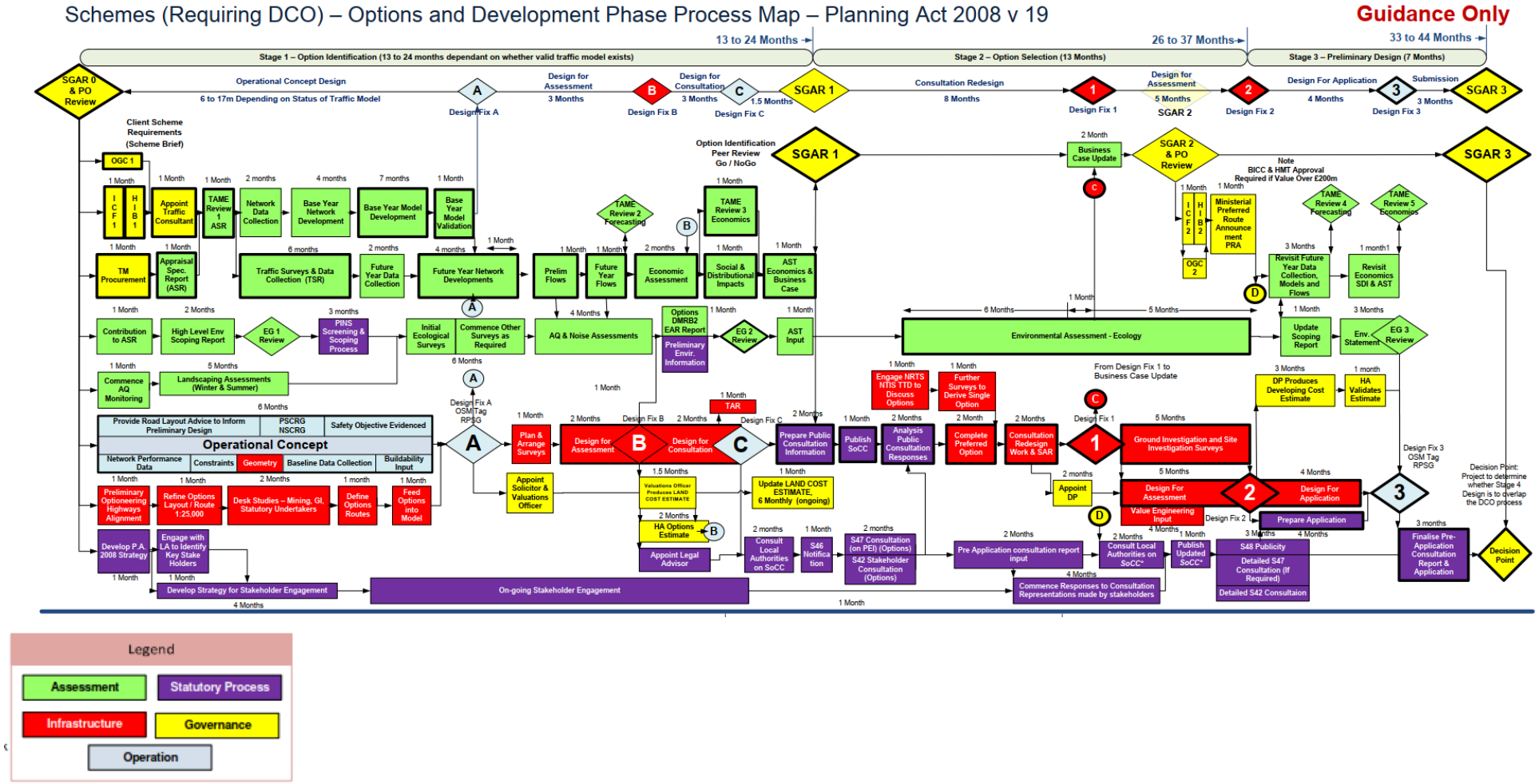
Black Cat Junction													
Assessment approach : Proportionate assessment for the stage of Scheme development and for sifting purposes only													
	Option 1a	**Option 1b**	**Option 1c**	**Option 1d**	**Option 1e**	**Option 2a**	**Option 2b**	**Option 3a**	**Option 3b**	**Option 4**	**Option 5**	**Option 6**	**Assumptions**
A428 WB > A1 SB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No but can continue on the existing A428 from the proposed Cambridge Road junction and join A1 at Wyboston junction	
A428 EB > A1 NB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
A428 EB > A1 SB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	6km diversion via A428 EB diverge > A1 NB, existing A1 to Wyboston junction, then double back	N/A	
3. Is access for local traffic maintained? (Y/N)	N	N	N	N	N	N	N	N	N	N	N	N	Green = Y Red = N
Is access from Bedford Road maintained? (Y/N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Green = Y Red = N
4. Is there potential weaving/queueing issues? (Y/N)	N	N	N	N	N	N	N	N	N	N	N	N	Green = N Red = Y
5. Length (m)													Green =< 2000 Amber = 2000 - 4500 Red = > 4500
Slip Roads (70kph)	2349	4774	3372	3530	3871	4622	4500	3814	3038	1290	598	1057	
Links (85kph)	2674	N/A	1988	N/A	N/A	1905	1714	N/A	2121	6089	1764	2763	
MainLine A1 (120kph)	1496	1496	1496	1138	1147	1400	1400	1739	1739	1943	1392	0	
5. Horizontal Alignment													
Departures													

Black Cat Junction													
Assessment approach : Proportionate assessment for the stage of Scheme development and for sifting purposes only													
	Option 1a	**Option 1b**	**Option 1c**	**Option 1d**	**Option 1e**	**Option 2a**	**Option 2b**	**Option 3a**	**Option 3b**	**Option 4**	**Option 5**	**Option 6**	**Assumptions**
Slip Roads (70kph)	low	low	low	low	low	high	high	low	low	low	low	low	Green = 0 - 2 Amber = 3 Red = > 4
Links (85kph)	low	low	low	low	low	low	low	low	low	low	low	low	
MainLine A1 (120kph)	low	low	low	low	low	low	low	low	low	low	low	low	
Relaxations													Green = 0 - 2 Amber = 3 Red = > 4
Slip Roads (70kph)	high	low	low	low	high	low	low	low	low	high	low	low	
Links (85kph)	high	N/A	low	N/A	N/A	low	low	N/A	low	high	low	low	
MainLine A1 (120kph)	low	low	low	low	low	low	low	low	low	low	low	N/A	
5. Impact on future A1 widening													
Are proposed works too extensive at junction if the A1 is moved offline?	Likely	Likely	Likely	Likely	Likely	Likely	Likely	Likely	Likely	Likely	Likely	Likely	Green = Unlikely Red =Likely
Is it compatible (with minimal abortive work) with online straightening / Expressway upgrade of existing A1	Likely	Likely	Likely	Likely	Likely	Likely	Likely	Likely	Likely	Likely	Likely	Likely	Green = Likely Red = Unlikely
Is the access to Bedford Road accomodated within the junction?	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Green = Y Red = N
Is the turn back movement possible?	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N	Green = Y Red = N
6. Safety of junction - Possible number of collisions at the roundabout approaches and at the merging connector roads	10	11	11	14	16	16	12	9	9	7	3	7	Green = 0-7 Amber = 8-11 Red = > 12
7. Intuitive layout? (Y/N)	Y	Y	Y	PARTIALLY	PARTIALLY	N	N	Y	Y	Y	N	N	Green = Y Amber = Partially Red = N
8. Major STATS in close proximity? - List Them? (Y/N)	Y -high impact to NG High Pressure Gas Mains, BT overhead and underground lines	Y -high impact to NG High Pressure Gas Mains, BT overhead and underground lines	Y -high impact to NG High Pressure Gas Mains, BT overhead and underground lines	Y -high impact to NG High Pressure Gas Mains, BT overhead and underground lines	Y -high impact to NG High Pressure Gas Mains, BT overhead and underground lines	Y -high impact to NG High Pressure Gas Mains, BT overhead and underground lines	Y -high impact to NG High Pressure Gas Mains, BT overhead and underground lines	Y -high impact to NG High Pressure Gas Mains, BT overhead and underground lines	Y -high impact to NG High Pressure Gas Mains, BT overhead and underground lines	Y -high impact to NG High Pressure Gas Mains, BT overhead and underground lines	Y -high impact to NG High Pressure Gas Mains, BT overhead and underground lines	Y -high impact to NG High Pressure Gas Mains, BT overhead and underground lines	Green = N Amber = Y - 1only / medium impact Red = Y - 2 or more / high impact
9. Does the option comply with the A428 expressway vision? (Y/N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Green = Y Red = N

Black Cat Junction													
Assessment approach : Proportionate assessment for the stage of Scheme development and for sifting purposes only													
	Option 1a	**Option 1b**	**Option 1c**	**Option 1d**	**Option 1e**	**Option 2a**	**Option 2b**	**Option 3a**	**Option 3b**	**Option 4**	**Option 5**	**Option 6**	**Assumptions**
Environmental/Social Impact													
10. Distance from centre of Roxton to nearest major construction area (m)	900	1060	1060	910	910	925	940	1150	1150	1180	1140	1200	Green = > 1100m Amber = 950m - 1100m Red = < 950m
11. Total Area required for construction (m2) (50m offset from masterstring)	low	low	medium	low	low	medium	medium	low	medium	high	low	low	Green = < 450,000m (Low) Amber = 450,001 - 550,000m (medium) Red = > 550,001m (high)
12. Area of construction within flood plain (m^2)	low	medium	medium	medium	low	high	high	medium	medium	high	medium	low	Green = < 50,000m (low) Amber = 50,001-100,000m (medium) Red = > 100,000m (high)
13. Number of houses within 500m of construction area?	high	medium	high	medium	medium	high	high	medium	high	high	low	high	Green = < 100 (low) Amber = 100 - 110 (medium) Red = > 110 (high)
14. Number of tiers at junction?	2	2	2	2	2	2	2	3	3	2	2	2	Green = 2 Medium =2-3m Red = > 3m
15. Impact on existing / proposed NMU routes? (Y/N)	Y - National Cycle Route will be impacted by roundabouts constructed on Roxton road	N	N	Y - National Cycle Route will be impacted by roundabouts constructed on Roxton road	Y - National Cycle Route will be impacted by roundabouts constructed on Roxton road	Y - National Cycle Route will be impacted by roundabouts constructed on Roxton road	Y - National Cycle Route will be impacted by roundabouts constructed on Roxton road	N	N	N	N	N	Green = > No impact Amber = Y - Medium Impact Red = Closed
16. Area of woodland removed?	low	low	low	low	low	low	low	low	low	low	low	low	Green = Low Red = High
17. Number of properties likely to be impacted?	high	high	high	low	low	low	high	high	high	high	medium	low	Green = 0 - 3 (low) Amber = 4 - 5 (medium) Red = > 5 (high)
18. Number of Structures?	4	5	6	4	3	3	5	6	7	6	1	2	Green = 0 - 3 Amber = 4 - 5 Red = > 5
19. Sites of Archaeological importance / listed buildings disturbed by option?	medium	medium	medium	low	low	medium	medium	medium	medium	medium	medium	medium	Green = 1-2 (low) Amber =3-4 (medium) Red = >5 (high)

Appendix D – National Highways DCO Process Map (version v19 from 2015)

Extract from the Process Map for PCF Stage 1, 2 and 3



Appendix E - Options Assessment Report (March 2016) [refer to APP-035]

Appendix F - A428 Black Cat to Caxton Gibbet Consultation Brochure March 2017 (March 2017) [refer to APP-035]