

**Kings Dyke Level
Crossing:
Major Scheme
Business Case**

Final Report

Kings Dyke Crossing

Final Report

Cambridgeshire County Council

March 2017

This document and its contents have been prepared and are intended solely for Cambridgeshire County Council's information and use in relation to the Kings Dyke Level Crossing Major Scheme Business Case.

Document history

Job number:			Document ref:			
Revision	Purpose description	Originated	Checked	Reviewed	Authorised	Date
1.0	Draft Report	SB	RMJ	JB	DB	
2.0	Final Report	SB	RMJ	JB	DB	13/3/17

Client sign off

Client	Cambridgeshire County Council
Project	Kings Dyke Level Crossing Major Scheme Business Case
Document title	Kings Dyke Level Crossing: Major Scheme Business Case – Final Report
Job no.	
Copy no.	
Document reference	

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1 Introduction

1.1 Background

The Kings Dyke Level Crossing Improvement Scheme involves provision of infrastructure to enable the closure of the Kings Dyke Level Crossing on the A605 between Whittlesey and Peterborough. The level crossing on the A605 at King's Dyke to the west of Whittlesey has long been a local issue due to the downtime of the barriers, and the subsequent delay caused to traffic travelling between Whittlesey and Peterborough.

Kings Dyke Level Crossing is an at-grade level crossing located on the A605 and crosses the railway line between Ely and Peterborough. The level crossing is a full barrier type locally controlled by an on-site Network Rail employee.

Figure 1.1 shows the location of the Kings Dyke Level Crossing, and the importance of the connectivity of the A605 between Whittlesey and Peterborough.

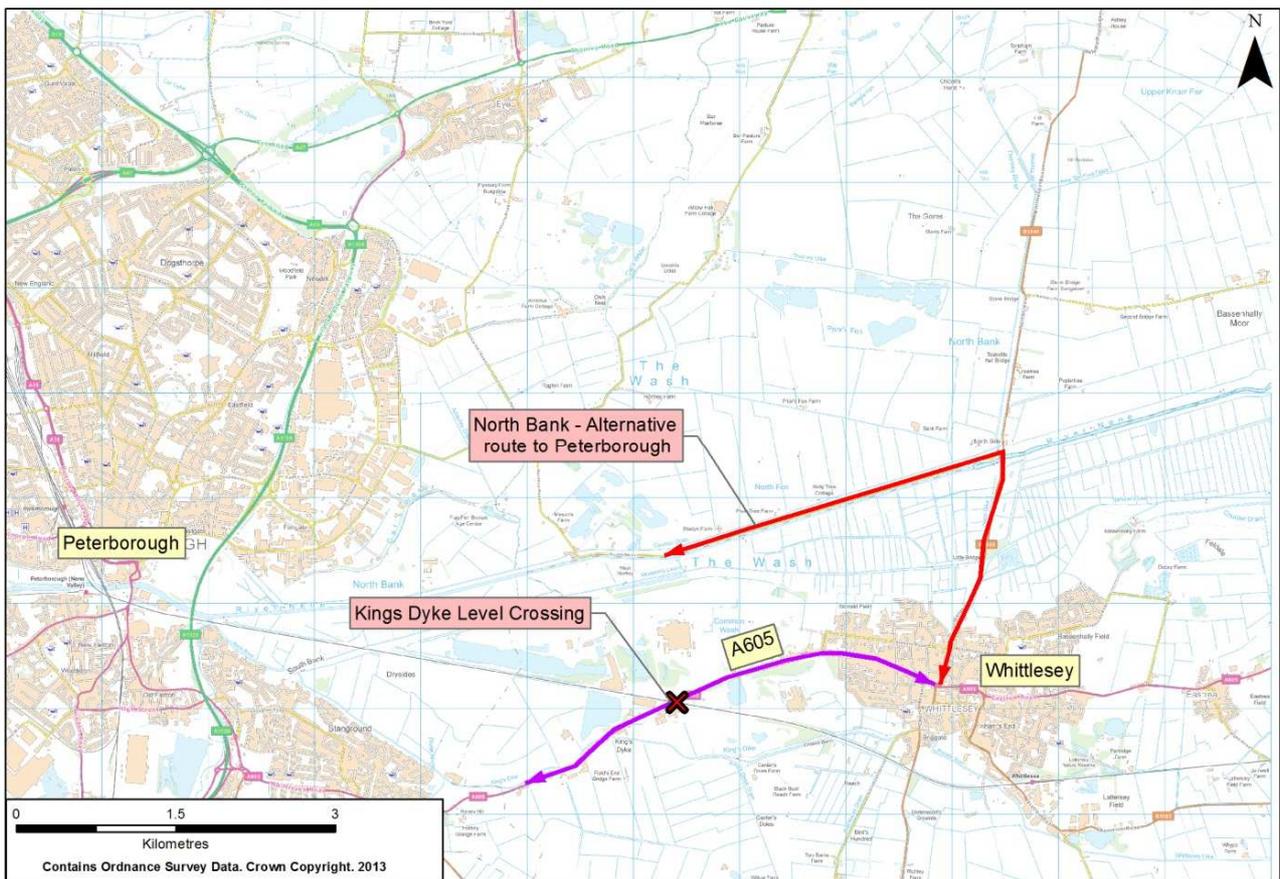


Figure 1.1 Kings Dyke Level Crossing Location

At present, there are between 95-100 train movements across the level crossing each day. In peak periods the barrier can be down for between 11-15 minutes each hour, which results in significant delays to traffic.

The A605 between Whittlesey and Peterborough carries an average of 11,000 vehicles per day, whilst North Bank provides an alternative route to Peterborough from Whittlesey which drivers use this route to avoid the traffic delays and congestion on the A605, particularly caused by the level crossing. However the North Bank is within the Nene Washes flood plain, and is often closed to traffic in winter months, with consequential increase in delays on the A605 due to an additional 5,000 vehicles travelling through Kings Dyke Level Crossing per day.

Rail industry plans suggest that train movements on the Peterborough to Ely line will increase significantly in the future. The number of passenger trains is likely to increase to around 130 per day. Improvements to the Felixstowe to Nuneaton freight route will also raise capacity for freight trains on the line to 112 each day. Consequently, by 2031 there could be 242 trains using the crossing each day – an increase of 150%. Additional trains will result in more frequent and longer level crossing closures, increasing congestion and delays. The implications for the road traffic congestion of an increase in barrier down time to between 27-38 minutes in each hour would severely hamper economic growth in the area.

2 Scheme Description

2.1 Overview

The A605 is an important east-west route between The Fens and Peterborough, and is identified as a strategic route for HCV traffic on the Cambridgeshire Strategic Advisory Freight Route. The A605 provides connections to the A1(M) and the A47 via the Peterborough Parkway Network.

The A605 between Whittlesey and Peterborough carries over 11,000 vehicles per day. It carries local traffic between Whittlesey and Peterborough as well as strategic traffic between the Fens and the strategic highway network.

North Bank provides an alternative route between Whittlesey and Peterborough, and carries approximately 5,000 vehicles per day. Drivers often choose this route to avoid the congestion and delays on the A605 at Kings Dyke Level Crossing. However this route is on the Nene Washes, which can flood throughout the year but especially in the winter months, which results in the road being closed and traffic forced onto the A605, which can exacerbate the queues and congestion at the crossing.

North Bank was completely closed to traffic for 11 separate occasions and for 55 days over the 12 month period between 1st April 2012 and 1st April 2013 representing 15% of overall time. The majority of closures were between October and February.

The A605 can suffer from unreliable journey times due to the uncertainty/variability of queue length and barrier down time, resulting in driver frustration. The 'Kings Dyke Level Crossing Replacement – Initial Investigation Report' prepared in June 2013 by Atkins (see Appendix A) calculated the average delay per vehicle at both Kings Dyke Level Crossing and Funtham's Lane Level Crossing. The average delay per vehicle at Kings Dyke Level Crossing is 41 seconds per vehicle and 38 seconds per vehicle at Funtham's Lane Level Crossing. This translates to a 2-hour total vehicle delay per closure at Kings Dyke Level Crossing and a 6 minute total vehicle delay at Funtham's Lane. If North Bank is closed, the average delay per vehicle can increase by 3-4 minutes in the peak period and the total vehicle delay can increase to over 6 vehicle hours.

2.2 Preferred Scheme

The Preferred Scheme is shown below in Figure 2.2.

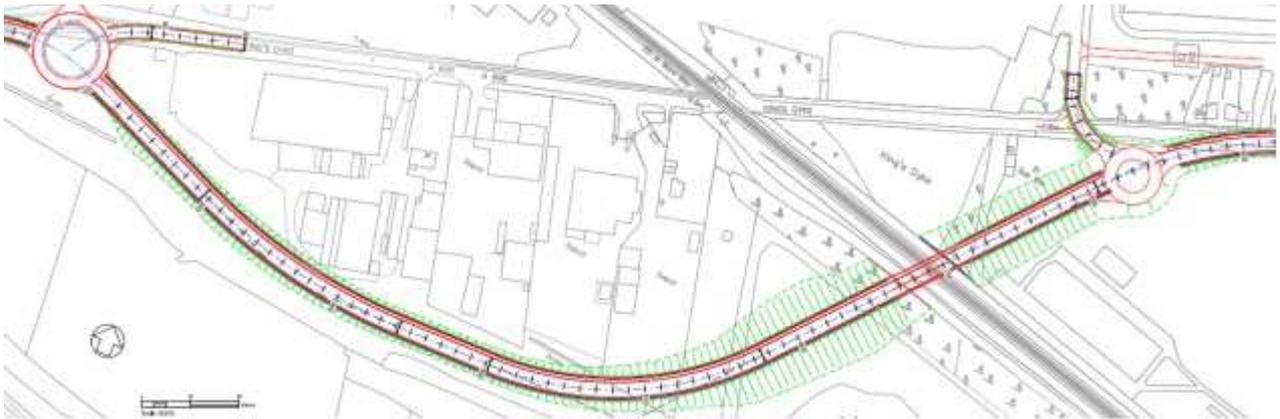


Figure 2.1: Kings Dyke Level Crossing Preferred Scheme

The Preferred Scheme is an off-line alignment to the south of the existing highway which would cross the Ely to Peterborough railway line, connecting into the existing A605 via new roundabouts at either end. The western roundabout would also provide a fourth arm connecting into Funtham's Lane

The proposed Kings Dyke link road scheme is approximately 1 km long. The carriageway would be 7.3m single carriageway with 1m hard strips together with 2.5m wide grass verges each side. The carriageway is designed for a 60mph speed limit and the 720m desirable minimum radius curve would have 5% super elevation. A four arm roundabout is proposed at its western end where it ties into the A605, the fourth arm of the roundabout is an access to the Funtham's Lane Industrial Estate.

3 The Strategic Case

3.1 Introduction

This chapter discusses the strategic case for the Kings Dyke Level Crossing Improvement Scheme, and demonstrates how the scheme will fit with local, regional and national policy and enable local growth aspirations.

3.2 Business Strategy

The vision for Cambridgeshire County Council is ‘making Cambridgeshire a great place to call home’. The Council’s priorities seek to deliver this vision and reflect the most important things Cambridgeshire County Council will do as a council

- Supporting and protecting people when they need it most
- Helping people to live independent and healthy lives in their communities
- Developing our local economy for the benefit of all

The third Cambridgeshire Local Transport Plan (LTP3) will contribute towards delivering the Council’s Priorities. The LTP3 also has five LTP Objectives which reflect the transport challenges facing Cambridgeshire and the need to strike a balance between enabling economic growth and tackling climate change.

1. Enabling people to thrive, achieve their potential and improve quality of life
2. Supporting and protecting vulnerable people
3. Managing and delivering the growth and development of sustainable communities
4. Promoting improved skills levels and economic prosperity across the county, helping people into jobs and encouraging enterprise
5. Meeting the challenges of climate change and enhancing the natural environment

3.3 Fit with the Wider Policy Context

3.3.1 National, Regional and Local Planning Policy

The **National Planning Policy Framework** (NPPF) sets out the Government’s planning policies for England and they are expected to be taken into account in the preparation of developments plans. The NPPF does not change the statutory status of the development plan as the starting point for decision making. Proposed development that accords with an up-to-date Local Plan should be approved unless other material considerations indicate otherwise. The currency of the development plan is an important factor.

All plans are expected to be based upon and to reflect the presumption in favour of sustainable development, with clear policies that will guide how the presumption should be applied locally. Sustainable development performs an economic, social and environmental role and involves seeking positive improvements in the quality of the built, natural and historic environment, as well as in people's quality of life, including (but not limited to):

- Making it easier for jobs to be created in cities, towns and villages;
- Moving from a net loss of bio-diversity to achieving net gains for nature;
- Replacing poor design with better design;
- Improving the conditions in which people live, work, travel and take leisure;
- Widening the choice of high quality homes.

The Greater Cambridge Greater Peterborough Local Economic Partnership (GCGPLEP) published its **Strategic Economic Plan** in April 2014. The goal of the plan is to 'develop our internationally competitive, nationally significant economy bringing together the diverse strengths of our area.

The Strategic Economic Plan is the vehicle for releasing the area's significant potential for continued economic growth, through a targeted range of interventions, which are:

- Digital connectivity and exploitation;
- Transport connectivity (more details provided in section 3.3.2 National regional and local transport planning policy);
- Removing the skills barriers to growth;
- Provision of incubator and innovation space;
- Accelerating business growth by targeted support through a growth hub;
- Alconbury Weald enterprise campus.

3.3.2 Fenland Local Plan

The Fenland Local Plan (adopted May 2014) identified Whittlesey as a key service centre in the district as one of the four market towns in Fenland. However Peterborough has a role as a major sub-regional centre, which has seen Whittlesey emerge as an increasingly popular location for out-commuters. Local employment opportunities do exist in Whittlesey with Hanson Brick and McCain foods located close to Whittlesey on the A605.

The Fenland Local Plan makes provisions for the following growth strategy in Whittlesey:

- New urban extensions north and south of Eastrea Road. The area to the north of the A605 will be predominantly residential whilst the area to the south, will be a mix of land uses, including residential.
- New businesses will be supported adjacent to the existing in the Station Road / Benwick Road Industrial Areas and to the west along the A605 and north of Kings Dyke as far as Fields End Bridge.

To the west of Whittlesey, there is also a proposal for a Regional Freight Interchange of around 135 hectares. The greater proportion (102 hectares) lies within the Peterborough administrative area, with about 33 hectares in Fenland. The site is located alongside the Peterborough – March – Ely rail line, which is part of the nationally designated freight route between Felixstowe and Nuneaton.

Policy LP11: Whittlesey states that when considering any planning application at this location, or in making comments to Ministers via the Major Infrastructure Planning Unit, the following specific issues will need to be addressed:

- strategic transport issues (rail and road) including potential impacts on the A605 and A47 and the railway level crossing closures at Whittlesea Railway Station and Kings Dyke;
- local transport issues, particularly with regard to Whittlesey (including access, congestion, junctions, cycling, walking and work travel plans);
- the impact of freight movements from businesses using the freight interchange, and of employees accessing work there

3.3.3 National, Regional and Local Transport Planning Policy

The **Department for Transport's Business Plan 2011-15** sets out the following vision: "Our vision is for a transport system that is an engine for economic growth but one that is also greener and safer and improves quality of life in our communities."

Its priorities for delivering this vision are:

- Deliver the Coalition's commitments on high speed rail;
- Secure our railways for the future;
- Encourage sustainable local travel;
- Tackle carbon and congestion on our roads;
- Promote sustainable aviation.

Recent funding programmes, such as the Local Sustainable Transport Fund, have given priority to schemes which address both of the following objectives:

- Support the local economy and facilitate economic development;
- Reduce carbon emissions.
- Proposals which in addition meet some or all of the following objectives have also been favourably considered:
 - Help to deliver wider social and economic benefits (e.g. accessibility and social inclusion) for the community;
 - Improve safety;
 - Bring about improvements to air quality and increased compliance with air quality standards, and wider environmental benefits such as noise reduction;

-
- Actively promote increased levels of physical activity and the health benefits this can be expected to deliver.

The **Strategic Economic Plan** highlights 'Transport Connectivity' as one of its prioritised intervention packages to realise the area's significant potential for continued economic growth.

The Plan recognises that transport constraints represent a key challenge to supporting housing and employment growth and continued economic prosperity as well as the impact aspiration to improve the frequencies of east-west train links across the region.

The plan identified that many of the constraints on business and housing growth concern transport:

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

Kings Dyke Crossing is referenced in the Major Transport Schemes and Local Sustainable Transport programme areas of focus, GCGP LTB area diagram¹.

The **Cambridgeshire County Council third Local Transport Plan (LTP3)**, which was refreshed and adopted in 2014, seeks to address existing transport challenges as well as setting out the policies and strategies to ensure that planned large-scale development can take place in the county in a sustainable way.

The development strategy for Cambridgeshire is focused on providing good quality and affordable homes closer to where people work in accessible locations with sustainable transport options readily available. New homes and jobs are proposed within and close to Cambridge and to other main centres of employment including Whittlesey.

While the development strategy has been developed to reduce the need to travel, there will still be pressures on the transport network, including the risks of increase congestion. The LTP3 also recognises and will continue to recognise that a number of strategic highway routes are currently operating at or near to capacity.

¹ http://www.gcgp.co.uk/wp-content/uploads/2013/10/GCGP-Strategic-Economic-Plan_WEB.pdf

The LTP3 outlines a number of key objectives which need to be faced in order to improve the strategic network. The Kings Dyke Level Crossing scheme contributes to a number of these challenges which are outlined in the table below.

LTP 3 Objective	Impact	Contribution of Kings Dyke
Managing and delivering growth	Positive	1000 new homes are planned for Whittlesey. This scheme will help ensure that congestion is not seen as a disincentive for investment in jobs and employment growth in the town
Promoting improved skill levels and economic prosperity across the county, helping people into jobs and encouraging enterprise	Positive	Whittlesey's economy is intrinsically linked with that of Peterborough and population growth in the town supports new jobs growth on the city including at planned Regional Freight Interchange on the east of the city, around two and a half miles from Whittlesey
	Positive	The scheme supports greater use of retail for freight and by passengers
Meeting the challenges of climate change and enhancing the natural environment	Positive	The scheme will ensure that negative environmental impacts of congestion at the level crossing due to increased train movement will be avoided
	Negative	Potential for visual intrusion on properties closest to the bridge.
Enabling people to thrive, achieve their potential and improve their quality of life	Positive	The scheme will enhance accessibility to and from Whittlesey both road and rails, broadening options for residents
Supporting and protecting vulnerable people	Positive	The scheme will markedly improve safety of the road and rail users, and pedestrians and cyclists who use the crossing and will improve the accessibility to and from the town for all residents.

Table 3.3: Cambridgeshire LTP3 Objectives and alignment with the Kings Dyke scheme

The LTP3 (adopted 2014) identifies Kings Dyke Level Crossing replacement as a committed scheme to be delivered by 2020. The LTP3 identifies the Kings Dyke Level Crossing replacements as Phase 1 of the Whittlesey Access Strategy. The three phases of this strategy are

- A605 Kings Dyke Level Crossing Replacement
- Stanground Access
- Whittlesea Station Improvements

The document states that the A605 Kings Dyke level crossing scheme will deliver the following benefits:

- Reductions in journey times and congestion on the A605 will reduce costs for travellers and businesses in and around Whittlesey.
- The accessibility of Whittlesey from the west will be improved, increasing its attractiveness as a place to live, work and do business.
- Accessibility to employment premises to the north and south of the railway on Funtham's Lane will be significantly improved.
- The reliability of rail services on the route between Ely and Peterborough will be improved with the removal of incidents of level crossing strikes.
- The safety of both the road and rail networks will be improved with the removal of the level crossing.

In addition, the Whittlesey Market Town Transport Strategy adopted in 2013, identified the need to look at the feasibility for options to close the level crossing as part of its action plan.

The Cambridgeshire Long Term identifies the Kings Dyke Level Crossing replacement as a key strategic scheme that will support growth across the sub-region.

3.4 The Need for Intervention

The need for intervention and the associated challenges can be summarised as follows:

- The A605 carries 11,000 vehicles on an average weekday between Whittlesey and Peterborough
- There are approximately 120 train movements across Kings Dyke Level Crossing per day, resulting in an overall barrier down time of between 8 and 20 minutes per hour.
- The level crossing creates a pinch point on the network resulting in traffic congestion and delays, particularly in peak periods for traffic travelling between Whittlesey and Peterborough. The typical average delay is 45 seconds per vehicle and the typical maximum delay is 7 minutes per vehicle.
- The alternative route of North Bank is often closed for long periods in winter months due to flooding. Therefore this exacerbates the congestion and delays, with an additional 5,000 vehicles using the A605 when North Bank is closed.

-
- Congestion at the crossing will increase in the absence of intervention:
 - Network Rail is planning substantial growth in passenger and freight services which will increase barrier down time
 - The Fenland Core Strategy identified Whittlesey as Market Town and a focus for housing and employment growth
 - Employment growth identified for Peterborough, as part of its Core Strategy, may increase the number of residents from Whittlesey commuting to Peterborough
 - A potential Regional Freight Interchange is proposed for the area
 - Proposals for more train paths and longer trains, means that the time and cost implications of level crossing failures will become increasingly significant for Network Rail, the Train Operating Companies, and rail passengers unless mitigation measures are implemented.
 - Kings Dyke Level Crossing is classified as being within a featureless landscape of industrial estates including brickworks with clay pits and stacks, sewage works and wind turbines dominating the landscape. However there are environmental sensitivities with regard to the natural and historic environment, including the presence of the flood plain and visual intrusion of any scheme on local residences, therefore any transport intervention needs to recognise and mitigate any environmental sensitivities within the scheme design.

Congestion at Kings Dyke Level Crossing Level Crossing

Congestion and poor journey time reliability on this section of the A605 limits access to the Fens and the trunk road system, for through and local traffic.

3.5 Impact of No Intervention

With work already under way to complete upgrades to the Ipswich to Peterborough section of railway which will lead to a significant increase in the number of freight trains and potentially, passenger trains in future. Alongside the potential increase in rail usage, there will also be significant capacity issues relating to level crossing which will impact on the growth of Whittlesey

The impacts of no intervention at Kings Dyke Level Crossing can be summarised as follows:

- There will be increasing congestion and delay on the A605

3.6 Internal Drivers for Change

With Government policy, and now the LEP Strategic Economic Plan, now focusing on job creation and the economy growth, there is an increasing need to improve the well-being of the local economy to make the Fens a more attractive place to live and work. Existing delays at the A605 level crossing undermine this aspiration.

3.7 External Drivers for Change

The external driver for change is:

- Increase in the number of freight trains passing through Whittlesey as part of Network Rail's strategy to divert such traffic off the North of London Line
- Increase in the number of passenger trains

Both drivers will cause the level crossing to close more frequently, hence resulting increasing delays to traffic and impact on journey time reliability.

3.8 Scheme Objectives

Objectives for intervention are set out in a number of policy documents including Cambridgeshire's third Local Transport Plan (LTP3) (2011-2015), the Cambridgeshire Long-term Transport Strategy, the Whittlesey Market Town Transport Strategy, and Fenland Local Plan (2014)

- The following objectives represent the transport outcomes required by any option
- Improve journey time and congestion on the A605
- Improve accessibility to Whittlesey from the west, increasing its attractiveness as a place to live, work and do business
- Improve accessibility to employment premises to the north and south of the railway on Funtham's Lane
- Improve the reliability of rail services on the route between Ely and Peterborough by removing the incidents of level crossing strikes
- Improve the safety of both the road and rail networks with the removal of the level crossing

The objectives are considered appropriate for the appraisal of a range of interventions to address capacity issues at Kings Dyke Level Crossing. However it is important that the environment, visual landscape and setting are also considered, as the nearby brick pits will form a country park in the future. Therefore an additional intervention objective has also been included

- Minimise the impacts of transport on the natural environment

A number of high-level goals can be identified in association for these objectives (see Figure 3.1) reflecting policies and outcomes identified within the Cambridgeshire LTP3, LTTS and Whittlesey Market Town Transport strategy alongside the Fenland Core Strategy. These can be summarised as follows:

- Enable proposed housing and economic growth to be accommodated in Whittlesey and beyond
- Support the delivery of increased levels of freight and passenger rail services
- Minimise the impact on the natural environment and views from the surrounding landscape

- Improve the resilience of the route and address the existing and long standing congestion issues.

The Figure below shows how national and local transport policy objectives fits with the High Level Goals set for the scheme.

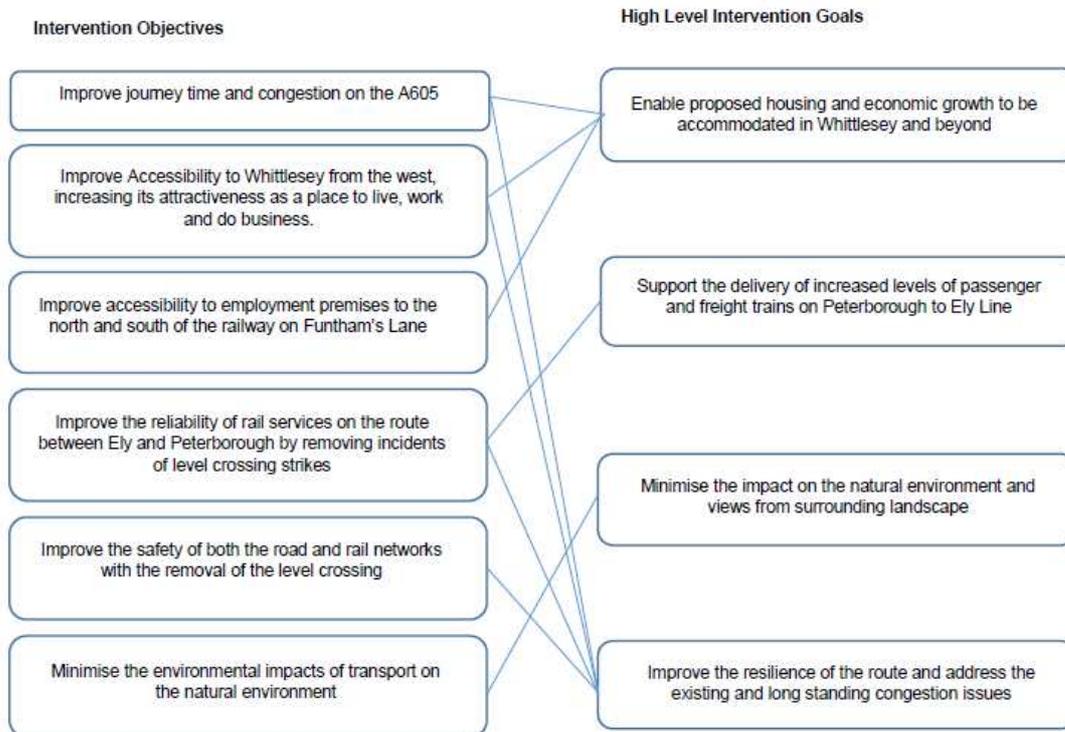


Figure 3.1: Policy fit with wider transport objectives

3.9 Measures for Success

The following outcomes are specified in the LTP3, and represent the transport outcomes whereby the success of the project can be measured:

- Relieving congestion and improving safety;
- Improve journey time reliability between Peterborough and Whittlesey
- Increase in air quality.

From a national stakeholder perspective, the challenges relating to journey times and reliability on the A605 are of primary importance.

3.10 Scope

The scope of the project is to produce a solution that meets the scheme objectives identified earlier. Nothing is out of scope.

3.11 Constraints

The project has many significant external project constraints to be overcome, including.

- Local businesses
- Existing brick pits
- The Peterborough to Ely railway line
- Land owners

The key internal project constraint is the financing of the project.

3.12 Inter-dependencies

3.13 Stakeholders

The key stakeholders for this scheme are:

- Cambridgeshire County Council;
- Fenland District Council;
- Greater Cambridgeshire Greater Peterborough Local Enterprise Partnership
- Network Rail;
- Landowners;
- Department for Transport;
- Historic England;
- Environment Agency;
- Natural England;
- Rural England;
- Parish Councils;
- Sustrans and other NMU representative groups;
- Business representative groups;
- Emergency Services;
- Utility Companies;
- Local Media.

3.14 Option Assessment Process

3.14.1 Evolution of the Scheme

The need for a scheme to replace Kings Dyke Level Crossing has been identified for over 20 years within Cambridgeshire County Council's TPP (Transport Policies and Programmes) and subsequent Local Transport Plan (LTP) documents.

When the scheme was first devised in the early nineties, it lay wholly within Cambridgeshire, with Cambridgeshire County Council as Local Highway Authority. However, in 1998 Peterborough became a unitary authority and became responsible for local roads within its district. At that time the crossing replacement was part of a four-phase scheme to improve the A605 between Peterborough and Whittlesey, which included:

- Replacement of Kings Dyke Level Crossing
- A605 Horsey Toll to Funtham's Lane Improvement
- Horsey Toll junction improvement
- Stanground Bypass

The latter two phases subsequently fell in to the Peterborough unitary area. The Stanground Bypass was completed and opened to traffic in October 2011 and was privately funded as a planning obligation to enable access to the Cardea housing development.

3.14.2 Alternatives Considered

The 'Engineering Options Feasibility Report' (dated June 2014) prepared by Mott McDonald identified seven potential options to improve the Kings Dyke Level Crossing, they are:

1. Online within existing highway boundary
2. Online within existing highway boundary allowing for temporary works or traffic management on land outside the highway during construction
3. Part online contiguous to the existing highway keeping one or more main line traffic flowing under traffic management control during construction
4. Off line alignment to the north
5. Off line alignment to the south
6. Tunnel Solution
7. Wider area bypass

The report assessed the construction methodology along with the feasibility to identify which options should be taken forward to the short-list, in which options will undergo a more detailed assessment on a number of different factors.

The Engineering Options Feasibility Report subsequently recommended the following options have been taken forward to the assessment of short-listed options:

- Option 3a - Part online to north
- Option 4 - Off line alignment to the north
- Option 5 - Off line alignment to the south

Each of these three options were subsequently assessed against criteria relating to Strategic, Value for Money, Financial, Delivery and Commercial themes, in line with the Government's 'Five Cases Model'², and reflecting the Government's Transport Appraisal Guidance (WebTAG) and local priorities. The results of this assessment are reported within the Kings Dyke Level Crossing Option Assessment Report dated January 2015.

The assessment drew on evidence available from a range of sources, including:

- Wider policy documents, including Fenland Local Plan Core Strategy, Cambridgeshire's Third Local Transport Plan, Cambridgeshire Long Term Transport Strategy, Whittlesey Market Town Transport Strategy
- Traffic data within the vicinity of the crossing
- Environmental assessments
- Analysis of available datasets
- Previous and supporting studies including Kings Dyke Level Crossing Improvement - Initial Investigation (June 2013) and the Engineering Options Feasibility Report (June 2014)

3.14.3 Rejection of the Lower Cost Option

3.15 Preferred Option

At a meeting held on 13 December 2011, Cambridgeshire County Councillors considered the Option Appraisal Report and resolved to agree:

- The development of a design and evaluation towards the submission of a planning application for the preferred route, Option5
- The preparation of Draft Compulsory Purchase Orders, Side Road Orders and Navigation Orders associated with preferred route option 5.
- The acquisition of the options to purchase required land and rights to facilitate early scheme delivery.

3.16 Summary

This chapter has shown that:

- Kings Dyke Level Crossing is a critical part of the strategic road and rail network, linking together a number of different settlements;
- The level crossing currently causes significant problems and issues affecting a number of local, regional and national objectives;

² Public Sector Business Cases using the Five Case (Green Book Toolkit), HM Treasury. (http://www.hm-treasury.gov.uk/data_greenbook_business.htm)

-
- The objectives of the scheme have been developed to address these problems and issues, and have been developed with full collaboration from the adjacent Local Transport Authorities whose own LTPs reflect the need for this scheme;
 - The preferred scheme (Option 5) has been identified and progressed following a through consideration of a range of options leading to scheme put forward for Conditional and Full Approval in this document.
 - The scheme is fully aligned with sub regional priorities for the area and will facilitate delivery of improved public transport services between Whittlesey and Peterborough;
 - The scheme is aligned with regional plans and will support the wider economic growth of the East of England economy;

The next Chapter will consider the value for money afforded by the preferred scheme.

4 The Economic Case

4.1 Introduction

This Chapter presents a summary of the appraisal and value for money assessment for the A605 Kings Dyke Railway Crossing. In accordance with WebTAG, the appraisal demonstrates how well the scheme performs compared to the Do-Minimum.

The scheme assessed is described in detail in Chapter 2, Scheme Description and the process that resulted in selection in Chapter 3, the Strategic Case.

4.2 Options Appraised

The following Options have been previously been appraised:

- Option 3 (£14.8m outturn BCR= 3.86)
- Option 4a (£12.6m outturn BCR 4.54)
- Option 5 (£16.9m outturn BCR 2.43)

Each of these options were assessed against criteria relating to Strategic, Value for Money, Financial, Delivery and Commercial themes, in line with the Government's 'Five Cases Model' , and reflecting the Government's Transport Appraisal Guidance (WebTAG) and local priorities.

- Wider policy documents, including Fenland Local Plan Core Strategy, Cambridgeshire's Third Local Transport Plan, Cambridgeshire Long Term Transport Strategy, Whittlesey Market Town Transport Strategy
- Traffic data within the vicinity of the crossing
- Environmental assessments
- Analysis of available datasets
- Previous and supporting studies including Kings Dyke Level Crossing Improvement - Initial Investigation (June 2013) and the Engineering Options Feasibility Report (June 2014)

All three options assessed would represent high value for money. Option 4 represents the highest value for money in BCR terms for both 'North Bank Open' and 'North Bank Closed' Scenarios.

Option 5 does not perform as well in the BCR calculations as Option 3a and 4 due to the presence of the roundabouts at either end of the scheme. This is because all vehicles must slow to negotiate roundabouts, which in turn increases journey times. In addition, the least cost effective solution would be Option 5 in the 'North Bank Open' Scenario.

4.3 Preferred Option

This report appraises the Value for Money of the Preferred Scheme (Option 5) against current WebTAG guidance.

4.4 Traffic Forecasting and Economic Appraisal

4.4.1 Introduction

The economic assessment of the project is an evaluation of the benefits likely to be received by road users set against the costs incurred by Government. This evaluation follows the principles set out by the Treasury in its Green Book and is undertaken in accordance with the approach set out by the Department for Transport in its web-based Transport Analysis Guidance (WebTAG 3.5).

The transport performance statistics are derived from a spreadsheet model which is able to capture capacity issues at the level crossing (delays caused by individual the level crossing closures).

4.4.2 Journey Time Benefits

The key benefit of a King's Dyke Level Crossing replacement would be saving the current cost of delay. Other benefits, which have not been quantified at this stage of the study include:

- **Road / Rail safety benefits.** There have been several high profile road accidents at level crossings, some of which have involved fatalities. Network Rail have a programme of replacing existing level crossings with alternative facilities, and are enhancing their strategy to reduce level crossing risk by closing level crossings or otherwise replacing them with bridges or underpasses where feasible. On average there are seven pedestrian and two to three vehicle occupant fatalities per year (excluding suicides) on Network Rail's level crossings.
- **Disruption due to level crossing failures.** On occasions level crossings fail, and when they do the barriers are effectively locked down to traffic. There was a recent incident, which occurred on the 20th December 2012, when the King's Dyke Level Crossing failed and was closed for over an hour. At this time there was effectively no other route between Whittlesey and Peterborough due to the closure of the B1040 and North Bank because of flooding. This alone raises issues of resilience.
- **Operation Costs.** Network Rail incurs substantial ongoing operational costs, both to maintain and operate the level crossing in a safer manor. Network Rail has reported the closure of 600 crossings saving £158 million in whole life operational costs, which is equivalent to a whole life cost saving of £0.25m per crossing. The savings at King's Dyke are expected to be considerably higher due to the current need to have on-site attendance.

4.4.3 Spreadsheet model

A spreadsheet-based model has been developed to analyse delays at the level crossing in detail, using local survey data.

Delay data was collected in March 2013 in the vicinity of the railway crossing, detailing each occurrence of delay to vehicles using the underpass, caused by HCVs blocking back onto the main carriageway. The frequency and length of these delays has been used to establish a measure of average delay per vehicle; and the distribution of these delays has been used to determine the standard deviation, from which reliability has been assessed.

No assumptions have been made regarding extended closure times for the level crossing in later years, as this would lead to additional diversions and a direct growth in benefits in proportion to closure times may therefore result in an over-estimation. For similar reasons, relating to the unknown quantity of diverting traffic, no additional delay per vehicle has been assumed while the number of vehicles being affected increases. The approach used therefore provides a relatively conservative estimation of additional benefits.

4.5 Environment

Environmental impacts include those where the physical expression of the option is paramount, that is Landscape, Heritage, Biodiversity and Water Environment, and those where the impact arises from changes in the traffic flows and their characteristics, namely Air Quality, Greenhouse Gases and Noise.

Assessments have been undertaken using both desk study and site-based understanding of the relevant environmental baseline and consider the quantitative and qualitative impact for the scheme, and using the topic headings and methodologies in WebTAG. Standard worksheets and supporting commentaries are presented in **Appendix C**.

Key issues of significance and discriminatory factors are summarised below:

Noise – Option 5 provides positive benefits in terms of NPV as 1 or 2 households will have a benefit in noise levels as a result of the scheme.

Air Quality - The expected changes in traffic flows between options are likely to be very small. Given the location of the scheme, the existing air quality in the area, the proposed designs and the likely changes in flows of the three options the results of a detailed air quality assessment between options would be very similar and add little value to the selection of a single option. On this basis the air quality will be reviewed at the single option appraisal stage and the results reported as part of the planning application submission.

Greenhouse Gases – Greenhouse gas emissions resulting from the production of materials used in infrastructure (embedded carbon) as well as those from the use of transport fuels are considered in the assessment.

For all options, the impact on greenhouse gas emissions is neutral. The two factors which influence the calculation of greenhouse gas emissions is often change in road length and increase/decrease in congestion.

The difference in the route length is minimal on all three options, and therefore unlikely to have a significant impact on the level of greenhouse gases.

Option 5 will reduce congestion, which currently occurs at the level crossing, therefore this may have a slight benefit with regard to the greenhouse gas emissions.

Landscape / Townscape – Option 5 would have an adverse effect on the visual landscape.

Option 5 would incorporate mitigation planning on the road embankments and on the bridge approaches, softening the look of the new structure and helping it to blend with its surroundings. However, the two new roundabouts adjacent to the residential properties would be visually intrusive for the residents and the road alignment would encroach in to more rural setting of the fenland landscape. For Option 5, there will be significant adverse effects predicted for the visual amenity of residents in the cottage on A605/Peterborough Road to the north-east of the level crossing, the residents in two properties to the north of the A605/Funtham's Lane junction and for users of the byway along Kings Dyke Drain in Year 1. In Year 15, the proposed incorporated mitigation planting will reduce the visual impacts to non-significant.

Historic Environment – Option 5 is are considered to have a moderate adverse impact on the Historic Environment, though an archaeological evaluation is required to understand what the presence, nature and significance of archaeology is in the study area. However the construction of is likely to have an impact on the wider landscape.

For Options 5, the removal of made ground for embankment construction would entirely remove archaeology remains within the ground and expose any archaeology remains beneath made ground. In addition piling would remove any archaeology within the footprint of each pile as it is driven downwards.

Ecology/Biodiversity - Options 5 has a neutral impact on the majority of the biodiversity areas identified in the assessment, though it will have a slight adverse impact on the small pockets of rough grassland alongside the railway; the loss of trees, shrubs and hedgerows on either side of the A605; and on the sub-optimal Great Crested Newt habitat (closet breeding pond 320m away).

Option 5 crosses small pockets of grassland with a proven reptile habitat (such as grass snake, common lizard and slow worm) and has the potential to have the greatest affect due to crossing areas where the Little Ringed Plover have bred. If Option 5 affects Star Pit Lake then there could be impact on water voles and also invertebrate habitat.

Water Environment – Option 5 would have a large adverse impact on the water environment as the majority of Option 5 would be located within Flood Zone 3. It is likely that there would be an impact on reducing the flood plain conveyance for part of this floodplain without mitigation. However there is unlikely to be impacts on water quality.

4.6 Social

Social impacts cover net monetary benefits, journey time savings and reliability improvements for commuters and other users; opportunities for increasing physical activity; journey quality; accidents; personal security; access to the transport system; affordability; and severance.

Key issues of significance and discriminatory factors are summarised below:

Option 5 delivers journey time and reliability benefits,

Journey quality will be improved, currently driver's frustration can be caused by unreliable journey times, and this will be reduced significantly, along with an improvement in safety. This will impact on approximately 11,000 vehicles a day.

All three options have a beneficial or neutral impact on the majority of social impacts. Option 5 has a slight beneficial impact on Severance as the presence of the roundabouts will assist with local residents and pedestrians crossing the road.

4.7 Benefit Cost Ratio

A Benefit Cost Ratio (BCR) has been calculated as follows:

- The Present Value of Costs has been calculated based on outturn costs presented in the Financial Case section (Section 5.5)
- Costs have been discounted over a 60 year period, and discounted to 2010 on 2010 prices (see Appraisal Cost Proforma Summary Sheets, Appendix D)
- Land Costs have been assumed at £500,000 for all options at this stage
- No risk has been included in the calculations
- Optimism Bias (OB) at 32% has been applied in line with guidance for Scheme Type B together with a QRA Pmean of £770,000
- No developer contributions have been included at this stage
- Traffic growth on the route has been included in the calculations, and is based on TEMPRO forecasts
- A weighted 'average' scenario has been included, and is based on North Bank being closed for 15% of the year and open for 85% of the year (based on actual events during 2013). Therefore the 'average' or 'weighted average' represents the benefits of the scheme with North Bank open for 85% of the time and closed for 15% of the time.

-
- Option 5 can be built off-line with traffic management required for the tie-in of the roundabouts at either end.

For Option 5 the weighted average BCR is calculated at 2.79, based on

- BCR = 0.85 North Bank Open,
- BCR = 13.74 North Bank Closed

Option 5 does not perform as well with North Bank open due the presence of the roundabouts at either end of the scheme. This is because all vehicles must slow to negotiate roundabouts, which in turn increases journey times. However, under the weighted average' scenario, it does offer high value for money.

It is considered that the approach used to estimate the benefits is conservative, as the crossing closure time for all future years is based on the existing observed crossing closures, and does not include the increased use of the railway that is currently proposed. However, as highlighted previously in this report, rail industry plans suggest that train movements on the Peterborough to Ely line will increase significantly in the future. The number of passenger trains and freight trains could increase 242 trains using the crossing each day, an increase of 150% compared to current usage levels.

Any increase in closure time would result in additional benefits for the bypass options. However, it should be noted that as closure times increase, the stacking and queuing options may be pushed beyond their supportable capacity and so reducing their potential benefits.

4.8 Value for Money Statement

The Department for Transport uses the following categories in relation to Benefit Cost Ratios: Low Value for Money if BCR = 1.0 to 1.5; Medium Value for Money if BCR = 1.5 to 2.0; High Value for Money if BCR = 2.0 to 4.0.

The BCR for the scheme is greater than 2.0, and hence it would offer High Value for Money.

It should be noted the BCR presented does not reflect the land allocation revisions currently being considered within the revised East Cambridgeshire Local Plan nor developers wider aspirations, which are substantially higher than current TEMPRO forecasts.

4.9 Social and distributional impacts

An initial (Step 0) assessment of social and distributional impacts (Appendix C) suggests that the potential impacts relating to air quality, noise, accidents, security, accessibility, personal affordability, and user benefits are unlikely to have a significantly adverse social or distributional effect on vulnerable groups.

4.10 Sensitivity and Risk Profile

No direct sensitivity testing has been undertaken. However as conservative assumptions have been made the reported. Hence

- The reported Present Value
 - No account has been taken of expected increase in train services, causing additional delay at the level crossing
- The reported Present Value of Costs is a maximum
- QRA and OB has been applied to the project costs
 - An OB of 32% has been assumed.
 - A QRA Pmean of £0.77m has been allowed for

Hence

- The reported BCR of 2.79 is the minimum value for the scheme.

4.11 Appraisal Summary Table

The Appraisal Summary Table for the scheme has been produced, and is contained within Appendix C.

5 Financial Case

5.1 Introduction

This section sets out the financial details of the scheme, including the outturn capital implementation cost, maintenance and operating costs, and funding sources.

5.2 Costs

5.2.1 Capital Investment Costs

The construction costs (excluding risk) have been estimated at July 2014 prices including outstanding preparation and supervision of the works, as shown in Table 5.1 below.

Item	Description	Unit	Cost
	Contract Works		
1	Base Construction Cost	sum	5,007,858.8
2	Additional Item - Permanent Works	sum	214,971.2
3	Temporary Works	sum	90,875.0
4	Prelim - Fixed	sum	26,600.0
5	Prelim - Time	sum	5,340,305.0
6	Sub Total	sum	6,372,807.5
7	Contractor's Profit	sum	701,008.8
	Contract Works Sub-total		£ 7,073,816
	Design Costs (Stage 1 and 2)	12%	£ 848,858
	Land Costs		£ 500,000
	Utility		£ 1,000,000
	Network Rail		£ 50,000
	Supervision Fees (Stage 3)	6%	£ 424,429
Total			£ 9,897,103

Table 5.1: Investment Costs (£million, 2014 prices)

These costs are then allocated by the year in which they would be incurred, as shown below in Table 5.2.

Calendar Year	Construction Cost	Land Cost	Other Cost	Total
2015	2.12		0.39	2.51
2016	2.12	0.50	1.55	4.17
2017	2.83		0.38	3.21
Total	7.07	0.50	2.32	9.90

Table 5.2: Profiled Investment Costs (£million, 2014 prices)

The capital investment cost of the scheme is £9.9m (2014 Prices, excluding Risk).

The scheme outturn cost (including QRA of P80 and 32% OB) is then shown beneath in Table 5.3. This assumes real cost increases and construction inflation costs of 5% per annum. General inflation has been assumed at 2.5% per annum. This shows a potential outturn cost of £16.02m.

Calendar Year	Construction Cost	Land Cost	Other Cost	Total
2015			0.28	0.28
2016	3.90	0.55	1.92	6.37
2017	4.09		0.37	4.46
QRA (P80)				1.03
OB (32%)				3.88
Total	7.99	0.55	2.57	16.02

Table 5.3: Outturn Costs (£million)

5.2.2 Capital renewal of infrastructure

Capital renewal costs cover structural repairs, and highway resurfacing over the life of the asset (assumed to be 60 years), with assumptions made in Table 5.4.

£000s	Do Minimum	Option 5
Resurfacing (existing costs)	120k every 10 years	
Resurfacing (additional costs)		£200k 10 years
Total Cost (60 yr total, 2010 price base)	£600	£1,000

Table 5.4: Capital renewal costs (£,000)

It is assumed that the capital renewal and maintenance costs of the bridge will be balanced by the saving of the level crossing structure is no longer required with the implementation of Option 5.

Calculation of the road resurfacing costs is based on pro rata rates for areas and lengths. Resurfacing costs are assumed at £200,000 every 10 years per kilometre of road for a single carriageway road.

5.2.3 On-going maintenance costs

On-going maintenance costs (Table 5.5) cover highway maintenance (includes bulb replacement, drain clearance, fencing repairs, grass cutting, line repainting, winter gritting) and ITS system maintenance.

£000s	Do Minimum	Option 5
Cost per annum (existing costs)	£5	
Cost per annum (additional costs)		£8
Total Cost (60 yr total, 2010 price base)	£300	£480

Table 5.5: On-going maintenance costs (£,000)

Do-minimum maintenance costs for the level crossing are avoided in the bypass improvement options.

5.2.4 Funding sources

Funding sources for Option 5 is presented in Table 5.6. Local Government funding will primarily be raised through Prudential Borrowing, and to a less extent developer contributions.

Some financial support could also be expected from Network Rail.

Financial Year	Investment Cost	LTB	Growth Deal	Other	Total income
15/16	2,500		2,500		2,500
16/17	9,500	3,000	2,500	4,000	9,500
17/18	4,020			4,020	4,020
18/19					
Total	16,020	3,000	5,000	8,300	16,020

Table 5.6: Funding sources (£million, Outturn)

5.3 Base Scheme Cost

Table 5.6 below shows the estimated profile of the base costs, including investment and operating costs. The Capital Renewal and Operating Costs are incurred following scheme completion in 2018, and are reported over a ten year frequency.

Calendar Year	Costs Excluding real cost increases		Contribution due to real cost increases		Cost inc. real cost increase (Base Cost)	
	Investment	Capital Renewal	Investment	Capital Renewal	Investment	Capital Renewal
2015	0.26		0.01		0.27	
2016	5.78		0.29		6.07	
2017	3.86		0.29		4.14	
2018						

2026						
2036		0.20		0.07		0.27
2046		0.20		0.15		0.35
2056		0.20		0.24		0.44
2066		0.20		0.36		0.56
2076		0.20		0.52		0.72

Total	9.90	1.00	0.58	1.35	10.48	2.35
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Table 5.7: Base Cost Scheme Profile (£million, 2014 prices)

The base scheme investment cost is £10.48m, and the base capital renewal costs are £2.35m over the assessment period.

Table 5.8 below shows the risk adjusted base cost profile including a Quantified Risk Allowance (QRA) of £ 770,618 (Pmean).

Calendar Year	Cost including Real cost increase (Base Cost)		Quantified Risk Assessment QRA P(mean)		Risk Adjusted cost using QRA P(mean)	
	Investment	Capital Renewal	Investment	Capital Renewal	Investment	Capital Renewal
2015	0.27		0.02		0.29	
2016	6.07		0.45		6.51	
2017	4.14		0.30		4.45	
2018						
2026						
2036		0.27		0.02		0.29
2046		0.35		0.03		0.37
2056		0.44		0.03		0.48
2066		0.56		0.04		0.61
2076		0.72		0.05		0.77
Total	10.48	2.35	0.77	0.17	11.25	2.52

Table 5.8: Risk Adjusted Base Cost (£million, 2014 prices)

The risk adjusted base scheme investment cost is £11.25m, and the risk adjusted base capital renewal costs are £2.52m over the assessment period.

Table 5.9 beneath shows the risk adjusted base costs including an optimism bias allowance of 32% (complex scheme with QRA). Note that in line with WebTAG guidance, no optimism bias is applied to operating costs.

Calendar Year	Risk Adjusted cost using QRA P(mean)		Total Contribution of optimism bias to costs for the year		Risk Adjusted cost using QRA P(mean)	
	Investment	Capital Renewal	Investment	Capital Renewal	Investment	Capital Renewal
2015	0.29		0.09		0.38	
2016	6.51		2.08		8.59	
2017	4.45		1.42		5.87	
2018						

2026						
2036		0.29				0.29
2046		0.37				0.37
2056		0.48				0.48
2066		0.61				0.61
2076		0.77				0.77

Total	11.25	2.52	3.60	0.00	14.85	2.52
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Table 5.9: Adjustment for Optimism Bias (£million, 2014 prices)

The inclusion of 32% optimism bias increases the risk adjusted base scheme cost by £3.6m to £14.85m.

5.4 Risk Assessment

A project risk register was developed when the project was initiated. The aim of the register is to develop a clear view of risks associated with the scheme and to evaluate the factors that could have a detrimental effect.

The risk register was based on the following documents:

- Department for Transport : Transport Analysis Guidance (TAG) Unit 3.9.3
- Treasury Taskforce Private Finance Technical Note No 5: How to construct a Public Sector Comparator
- The key areas that were identified in relation to the project are:
 - Permissions and Policy
 - Economic and Procurement
 - Design
 - Construction
 - Performance
 - Environmental and Integration.

Permission and Policy Risk: Cambridgeshire County Council and its partners would work closely with the Planning Authority, Environment Agency and other statutory bodies to ensure the scheme meets their aspirations for the area Consultation with stakeholders and feedback from the public will be reflected in the design to ensure that the scheme reflects the needs of the local community.

A planning application will be submitted in late 2015.

The possibility of protestor action is considered to be medium risk, as is the potential for a public inquiry

Economic / Procurement: It is considered that Early Contractor Involvement (ECI) would reduce the risk of cost overrun by selection of appropriate design and construction methods.

Design: The scheme has adopted a PRINCE 2 Process Model method to ensure sound project management procedures are applied. The use of this process will reduce the risk of programme over-run during the design stage.

The scheme carries a full CDM requirement and a CDM Co-ordinator has been appointed. Registers will be maintained to document the design process.

Construction: There is a risk of damage to plant and injury to personnel from working with or adjacent to live services. Contact will therefore be established with the Statutory Authorities responsible and contact will continue through the final design and construction stages. Full design details will be supplied to affected organisations in order that appropriate and necessary measures are taken to divert or protect plant and highway users.

Since the scheme requires a large amount of imported fill there is a risk that associated costs will be underestimated. There are local sources of acceptable fill material available.

Unforeseen ground conditions represent a considerable risk to major construction schemes in rural locations. Comprehensive ground investigations and analysis of data will be undertaken and given due consideration within the final design.

Performance: There is a risk that operating and maintenance costs will be higher than expected. Existing costs have been considered for highways with similar attributes.

The design considers appropriate safety measures to mitigate potential concerns highlighted through safety advice and staged safety audits.

Working with NR to ensure major necessary and timely approval is identified as a key risk to be managed through proactive consultation and engagement.

Environmental and Integration: Environmental, ecological and archaeological studies will be undertaken and the findings will form a key part of the design process. It is possible that additional site measures will be required though these should be minimal due to the comprehensive nature of the studies undertaken.

Borehole studies will be undertaken with piezometers placed to monitor groundwater trends. The risk of pollution to groundwater is considered low and full co-operation with the Environment Agency will address this issue.

It is envisaged that the risks will reduce further during the life of the project and as more information becomes available. This will give more certainty as far as costs are concerned.

5.4.1 Quantified Risks Assessed

A quantified Risk Assessment (QRA) has been undertaken on the risks, and the Pmean has been calculated. The scheme will require a S151 Officers Sign-off guaranteeing the DfT that Cambridgeshire County Council will complete the work and fund any additional costs themselves if the costs do escalate and exceed the Pmean.

The Quantified Risk Assessment (employer's risks) is included in the Appendix.

The results are as follows:

P(mean)	£770,618
P(80)	£1,026,389
P(100)	£2,140,097
P(100) – P(mean) =	£1,369,479

The Optimism Bias used in the preparation of the construction cost estimates is informed by information contained in the Green Book supplementary guidance: optimism bias (HM Treasury 2013) with reference to the Review of Large Public Procurement in the UK (Mott MacDonald 2002). The document notes that there is a demonstrated, systematic, tendency for project appraisers to be overly optimistic and that to redress this tendency, appraisers should make explicit empirically based adjustments to the estimates of a project's costs, benefits and duration.

HM Treasury recommends that these adjustments be based on data from past projects or similar projects elsewhere and adjusted for the unique characteristics of the project in hand in the absence of a more specific evidence base.

An appropriate Optimism Bias to apply is an uplift of 32% for the civil engineering works, given that a Risk Assessment has been undertaken and the scheme itself may be technically difficult.

5.4.2 Risks and Costs to Cambridgeshire County Council

In addition to the above, there are additional risks to Cambridgeshire County Council.

The funded cost are based on the estimated outturn cost of the scheme plus risk allowance, but excluding optimism bias, and where the risk allowance is based on the Pmean. Pmean is the likely (cost outcome of the quantified risk assessment (QRA) as opposed to P100 which is the maximum costed outcome of the QRA. The QRA has examined the probability of increased costs to the project and the associated cost, but the likelihood is that all identified risks will not come to fruition. But the worst case scenario is that they will, in which case Cambridgeshire County Council will be expected to fund the difference (P100 – Pmean) of £1,369,479m

The estimated outturn cost includes inflation at an assumed rate of 5% in 2015 and beyond.

Without Optimum Bias, the Pmean outturn cost of the scheme assuming the above inflation rate, and with construction starting during 2016, is £11,880m.

5.5 Cost Summary

Scheme Costs (excluding operating costs) are summarised below.

- Investment Cost = £9,90m
- Outturn Cost (allowing P80 and 32% OB) = £16.02m
- Base Cost = £10.48m
- Risk Adjusted Base Cost (Pmean) = £11.25m
- Risk Adjusted Base Cost (Pmean) with 32%OB = £14.85m

These costs are summarised by year in the Appraisal Cost Proforma Summary Sheet.

5.6 Funding

A summary of the Funding Requirements are shown beneath in Table 5.10.

Financial Year	LTB	Growth Deal	Other	Investment Cost
15/16		2,500		2,500
16/17	3,000	2,500	4,000	9,500
17/18			4,020	4,020
18/19				
Total	3,000	5,000	8,300	16,020

Table 5.10: Funding Requirements by Year – Outturn (£, 000's)

5.7 Section 151 Officer Sign-off

The Council's Section 151 officer has taken account of this position in signing off as follows in accordance with section 4.7.17 of the Guidance for the purpose of the Financial Case by including the following:

'I confirm the accuracy of the cost estimates and that they represent the best estimates of cost based on the available information'

And;

'I confirm that the authority has the means to accept the financial liability of the scheme going ahead as per the current guidance'.

5.8 Summary

This section has shown capital investment costs associated with the scheme, along with the capital renewal costs and ongoing maintenance costs. It has also identified the funding sources and phasing for this scheme.

6 The Commercial Case

6.1 Introduction

This chapter sets out the Commercial Case for the scheme including procurement and contract information, in line with WebTAG requirements.

6.2 Output Based Specification

The output specification is to replace the existing Kings Dyke level crossing of the Peterborough to Ely railway line with an over bridge, allowing its permanent closure.

The scheme would

- Enable the closure of the existing Network Rail level crossing.
- Improve journey time reliability
- Enable the delivery of economic growth to Whittlesey

6.3 Procurement Strategy

The scheme would be procured through an OJEU tendering process using a standard NEC contract.

An Early Contactor Involvement (ECI) two stage design and build contract. This is a collaborative form of contract which brings together the contractor in to the project team early, with the team working together through the design and construction phases. This provides benefits of ensuring that the contractor can use his experience in the design phase to reduce overall project risk and ensure buildability.

Although an ECI contract would be awarded for design and construction, the process is divided in to two parts, the first phase covering the detailed design and consents process, with construction as the second phase. There is a presumption that the scheme will be delivered as a single package but there is no guarantee that the contractor will move directly from detailed design to construction. This would be conditional on satisfactory performance and agreement of a construction target price. The contract will give ownership of the design to the County Council, so that in the rare event a target price cannot be agreed, it may be used to re-tender the construction.

Target cost contracts are now the standard form of construction contract. They have been used successfully by the Council on a number of framework contracts. The benefit is that the contractor and client are incentivised to deliver the project on time and budget as underspends or overspends are shared at the end in agreed proportion in accordance with final cost.

There are a number of risks around the Kings Dyke Crossing Scheme; key amongst these are:

- Earthworks;
- Difficult ground conditions;
- Construction of the bridge over the railway and the river;
- Liaison and co-ordination with the rail industry;
- Diversion of statutory undertakers plant and services;
- Weather;
- Flood risk.

With the exception of diversion of statutory undertakers' services, and some weather and flooding events, the above risks would all be best placed with a contractor who will have the necessary experience to manage them and coordinate construction activities with third parties appropriately.

The nature and location of the site means that weather and flooding may impact on the work programme. Advice suggests that placing all weather risk on the contractor is unreasonable and that a reasonable allocation of risk is to place the cost of weather and flooding events with the contractor, but if the event was exceptional than an extension of time only should be awarded.

6.4 Sourcing Options

The contract will be tendered under in with the County Council's procurement requirements and Procurement Regulations. As the work is not in the scope of any available framework contract, it will be individually tendered under EJEU procedures.

The ECI two stage approach mitigates against cost and programme overruns as there is much greater certainty over the design and understanding of the risks at the point the construction target price is agreed. Developing this understanding can result in a longer contract period but one that is likely to be realistic.

6.5 Payment Mechanisms

Contract payments will be made on the basis of monthly interim claims against work completed.

6.6 Pricing Framework and Charging Mechanisms

Target cost contracts are now the standard form of construction contract. They have been used successfully by the Council on a number of framework contracts. The benefit is that the contractor and client are incentivised to deliver the project on time and budget as underspends or overspends are shared at the end in agreed proportion in accordance with final cost. These proportions will be contained in the contract to ensure incentives for the contractor to provide best value are maximised.

6.7 Risk Allocation and Transfer

Risk management is referred to in detail in the Delivery Case chapter, and the Quantified Risk Assessment is taken into account in the Financial Case.

6.8 Contract Length

The overall length of contract is anticipated to be 14 months.

6.9 Contract Management

A consultant is being appointed through a framework contract to act as Project Manager to administer the contract as required by the NEC. Sufficient delegated authority will be delegated to ensure quick decisions can be made to avoid delays. A client manager will oversee the contract and report progress and financial position to the Project Board. Any significant decisions may be escalated by the board to the County Council's Economy and Environment Committee.

High level timescale:

- Summer 2015 - planning application preparation, negotiation with land owners and tendering for contractor
- November 2015 - planning application submitted
- Autumn 2015 - start detailed design with chosen contractor
- March 2016 - earliest possible start date for on-site works
- June 2017 - earliest possible completed construction of level crossing replacement

7 The Management Case

7.1 Introduction

The County Council's Economy and Environment Committee has approved the preparation and submission of a planning application for the recommended scheme, together with the

- procurement of the planning application, detailed design and construction of the scheme through an Early Contractor Involvement Design and Build Contract; and the
- Negotiation of land and rights acquisition required for the early delivery of the scheme and the preparation of Compulsory Purchase and Side Road Orders.

The Planning application will be submitted in November 2015 and will be considered by the County Council's Planning Committee as a regulation 3 application

7.2 Evidence of Similar Projects

Addenbrooke's Access Road in Cambridge, a project of similar scope including a road and rail bridge was delivered using early contractor involvement in the design phase to eliminate and reduce risk in delivery by ensuring that construction methodology, programming and logistics were achievable.

The delivery of the Cambridge Guided Busway was reviewed by an independent consultant and a report included a number of "lessons learned" which have been incorporated into this scheme, especially in respect of the form of contract and contractual arrangements being used.

7.3 Programme / Project Dependencies

The scheme supports NWR policy of closing level crossings and facilitates the increased use of the railway for rail network, particularly for freight transport. The level crossing that will be closed as part of this scheme limits potential for increasing the use of the railway network.

7.4 Governance, Organisational Structure and Roles

Key decisions relating to the project are the responsibility of the County Council's Economy and Environment Committee.

The Economy and Environment Committee of the County Council has established a Project Board to oversee the continued development and delivery of the scheme and provide a forum for delivery issues and to be considered and resolved and risk to be reviewed.

The board comprises: a delegated member of the committee, the local County Council member for the area, two District Council members, a senior county council financial officer, the Service Director for Strategy and Development, a Network Rail representative, East Cambridgeshire District Council senior officers. It is attended by technical specialists and other key stakeholders as necessary.

A project team is responsible for delivery and the necessary day to day management of consultants and contractors. The team is led by the County Council's Project Manager and comprises of County Council Major Infrastructure Delivery Officers and commissioned specialists.

The project management structure is shown overleaf in Figure in 7.1.

7.5 Programme / Project Plan

The project plan is appended, with key milestones and progress, including critical path.

A provisional programme is outlined below:

- Tender preparation –April 2015-Nov 2015;
- PQQ issued- November 2015
- Tender period – December 2015-April 2016;
- Award contract – April 2016;
- Detailed Design and construction – April 2016-February 2018.

7.6 Assurance and Approvals Plan

The scheme requires planning consent, land acquisition and side road orders.

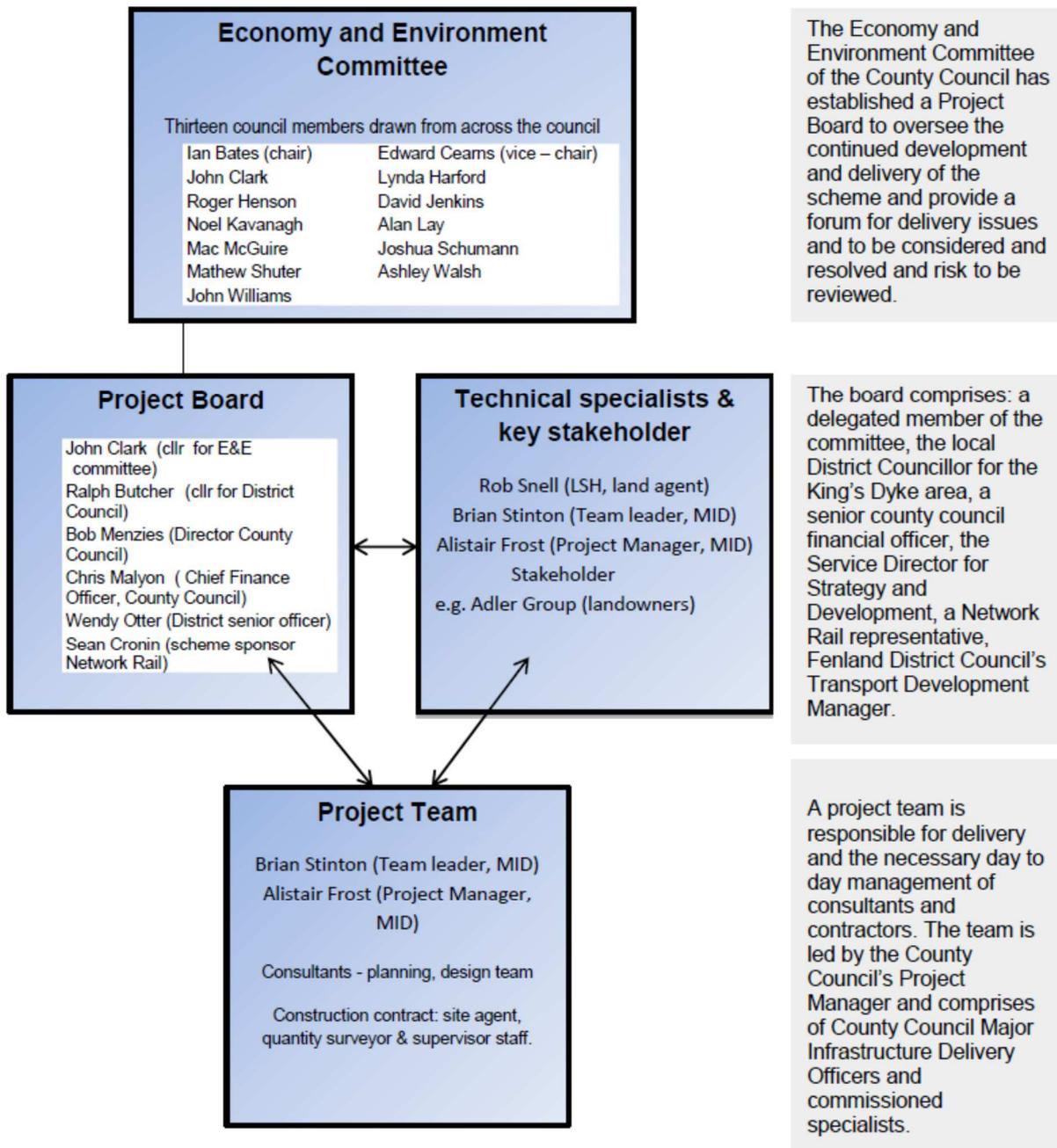


Figure 7.1: project Management Structure

7.7 Communications and Stakeholder Management

7.7.1 Stakeholder Engagement

The scheme has strong stakeholder support.

This scheme was identified as a requirement in Cambridgeshire's Third Local Transport Plan (2011-2031) this policy document was consulted on extensively with key stakeholders and local residents.

The planning application for the proposed scheme, to be submitted in the autumn of 2015, will also provide the opportunity for key stakeholders and the general public to provide feedback on the proposed scheme.

Fenland District Council is represented on the project board

Regular liaison with landowner/occupiers of adjacent land is undertaken

The key stakeholders include:

- Landowners;
- Department for Transport;
- Cambridgeshire County Council;
- Fenland District Council
- Historic England;
- Greater Cambridgeshire Greater Peterborough Local Enterprise Partnership ;
- Environment Agency;
- Natural England;
- Rural England;
- Parish Councils;
- Sustrans and other NMU representative groups;
- Business representative groups;
- Emergency Services;
- Utility Companies;
- Local Media.

7.7.2 Public Consultation

A public consultation exercise for the proposed scheme ran from 30th October 2014 to 15th December 2014. A total of 827 responses were received which included a significant number from local businesses.

The consultation information and associated on-line questionnaires were used alongside more conventional printed media methods. The 'Discovering Whittlesea' magazine, with a local distribution of 8.500 delivered to Whittlesey, Eastrea and Coates, also carried the details of the options and where local consultation events were being held. The District and Town Councils were also directly involved, displaying posters to highlight local consultation events. Questionnaires were made available at events and through libraries. Additional stakeholder specific meetings for the Town Council and at Hanson's Brick Works were held.

Of the 827 responses to the consultation, 95% supported intervention to enable closure of the level crossing. 58% of respondents chose the preferred options as the solution they would like to see delivered. In addition a large number of respondents expressed the view that delivery should begin as quickly as possible.

7.8 Key Issues for Implementation

The table beneath assesses the complexity of scheme delivery, taking into account buildability, disruption during construction, operational viability, likely delivery agents (complexity of partnership arrangements), stakeholder acceptability, and public acceptability / support.

Social	Option 5 Off Line Alignment to South
Buildability	Some buildability issues
	Potentially very poor ground conditions (peat) – may require foundations to the approach road earth embankment
	Construction in close proximity to existing open clay pit to the east and filled in clay pit to the west, also construction in flood plain.
	Not building over existing signal box
Disruption during construction	No significant disruption
	Off-line construction
Operational Viability	Operationally Viable
	Would enable the level crossing to be closed to all traffic, with the road to the crossing remaining in operation but only to service those vehicles that need to access premises and properties
Likely delivery agents – complexity of partnership	Low Complexity
	Cambridgeshire County Council, Fenland District Council and Network Rail would need to organize possessions to close line for up to 52 hours which generally requires two years notice
Stakeholder and Public Acceptability	Most Favoured Option
	58% of respondents favoured this options.
	All of the stakeholder responses stated a preference for Option 5
Impact on Local Businesses	Moderate Adverse
	Option has a moderate adverse impact on Church Field Farm Stables as the proposed scheme would result in the loss of car parking for events, which in turn could impacts on the number and size of events the business could run, and therefore impact on the income of the business. In addition, the proposed scheme would split the site, with the paddocks and gallops located on the other side of the road to the stables, however this can be mitigated by providing a track and underpass between the stables and the paddocks to ensure access is maintained.
	The remaining businesses to the north and south of the A605 have minimal, if any impact. The businesses to the north may have a benefit with regards to access/egress from Funtham's lane, as the provision of roundabouts at either end of the scheme providing a break in the traffic.

There are no significant buildability, construction or operational viability issues; partnership working across delivery agents would be relatively straightforward; and the scheme has strong stakeholder and public support overall.

7.9 Risk Management Strategy

In accordance with Government advice contained in GOMMS, a project risk register was developed when the project was initiated. The aim of the register is to develop a clear view of risks associated with the scheme and to evaluate the factors that could have a detrimental effect.

The risk register was based on the following documents:

- Department for Transport : Transport Analysis Guidance (TAG) Unit 3.9.3;
- Treasury Taskforce Private Finance Technical Note No 5: How to construct a Public Sector Comparator.

The key areas that were identified in relation to the project are:

- Permissions and Policy;
- Economic and Procurement;
- Design;
- Construction;
- Performance;
- Environmental and Integration.

Permission and Policy Risk: Cambridgeshire County Council and its partners would work closely with the Planning Authority, Environment Agency and other statutory bodies to ensure the scheme meets their aspirations for the area. Consultation with stakeholders and feedback from the public will be reflected in the design to ensure that the scheme reflects the needs of the local community.

A planning application will be submitted for the scheme in autumn 2015.

Economic / Procurement: It is considered that Early Contractor Involvement (ECI) would reduce the risk of cost overrun by selection of appropriate design and construction methods.

Design: The scheme has adopted a PRINCE 2 Process Model method to ensure sound project management procedures are applied. The use of this process will reduce the risk of programme over-run during the design stage.

The scheme carries a full CDM requirement and a CDM Co-ordinator has been appointed. Registers will be maintained to document the design process.

Construction: There is a risk of damage to plant and injury to personnel from working with or adjacent to live services. Contact will therefore be established with the Statutory Authorities responsible and contact will continue through the final design and construction stages. Full design details will be supplied to affected organisations in order that appropriate and necessary measures are taken to divert or protect plant and highway users.

Since the scheme requires a large amount of imported fill there is a risk that associated costs will be underestimated. There are local sources of acceptable fill material available.

Unforeseen ground conditions represent a considerable risk to major construction schemes in rural locations. Comprehensive ground investigations and analysis of data will be undertaken and given due consideration within the final design.

Performance: There is a risk that operating and maintenance costs will be higher than expected. Existing costs have been considered for highways with similar attributes.

The design considers appropriate safety measures to mitigate potential concerns highlighted through safety advice and staged safety audits.

Working with Network Rail to ensure major necessary and timely approval is identified as a key risk to be managed through pro-active consultation and engagement.

Environmental and Integration: Environmental, ecological and archaeological studies will be undertaken and the findings will form a key part of the design process. It is possible that additional site measures will be required though these should be minimal due to the comprehensive nature of the studies undertaken.

Borehole studies will be undertaken with piezometers placed to monitor groundwater trends. The risk of pollution to groundwater is considered low and full co-operation with the Environment Agency will address this issue.

It is envisaged that the risks will reduce further during the life of the project and as more information becomes available. This will give more certainty as far as costs are concerned.

7.10 Benefits Realisation Plan

The benefits to be realised from the scheme include the following:

Relieving congestion and improving safety – by removing all delays at the level crossing the improvement scheme will improve journey time reliability along the route.

Improving transport for all – the new link road will improve travel conditions by:

- Reducing delays for motorists, and
- Improving the reliability of bus services.

Encouraging growth and supporting local businesses – by reducing congestion along the A605 it will assist plans by Fenland District Council to make Whittlesey a more attractive place to live and work

7.11 Monitoring and Evaluation

The future performance of the scheme will be monitored and fully evaluated against the following scheme objectives.

Improved road safety – accident statistics will be analysed before and after scheme completion.

Improved journey time reliability – traffic and journey time data will be collected and analysed before and after scheme completion.

7.12 Contingency Plan

A wide range of options were considered and none were considered to be deliverable.

8 Summary

Economy	Option 5 Off Line Alignment to South
Strategic Case	Strong performance overall but adverse environmental impacts
	<p>Large or moderate beneficial impact in terms of transport-related intervention objectives and high level goals relating to growth, economic development and strategic rail and road improvements.</p> <p>Supports spatial planning policies in terms of supporting housing and economic growth in Whittlesey</p> <p>Environmentally there is a large beneficial impact with regards to noise and a neutral impact on greenhouse gases. However there are moderate or large adverse impacts on landscape, historic environment, biodiversity and water environment.</p>
Value for Money Case	<p>Good performance on economic and social impacts, but moderate environment impacts and moderate impact on local businesses</p> <p>BCR = 0.85 (North Bank Open) (does not represent VfM) BCR = 13.79 (North Bank Closed) (High VfM)</p>
	<p>Performs well on journey time savings and reliability, however it is the lowest performing of the three options, this is due to the provision of roundabouts at either end of the route (vehicle must slow to negotiate roundabouts which in turn increases journey time).</p> <p>Environmentally there is a large beneficial impact with regards to noise and a neutral impact on greenhouse gases. However there are moderate or large adverse impacts on landscape, historic environment, bio-diversity and water environment.</p> <p>Beneficial or neutral impact on the majority of social impacts. No adverse impacts.</p> <p>Option has a moderate adverse impact on Church Field Farm Stables as the proposed scheme would result in the loss of car parking for events, which in turn could impacts on the number and size of events the business could run, and therefore impact on the income of the business. In addition, the proposed scheme would split the site, with the paddocks and gallops located on the other side of the road to the stables, however this can be mitigated by providing a track and underpass between the stables and the paddocks to ensure access is maintained.</p> <p>The remaining businesses to the north and south of the A605 have minimal, if any impact. The businesses to the north may have a benefit with regards to access/egress from Funtham's Lane, as the provision of roundabouts at either end of the scheme providing a break in the traffic.</p>
Financial Case	Moderate implementation cost
	Outturn cost to implement - £16 million
Delivery Case	Some challenges with regards to construction, significant support from stakeholders, businesses and public
	<p>No significant construction or operational viability issues.</p> <p>Buildability issues include potentially very poor ground conditions, close proximity to existing open clay pit to the east and filled in clay pit to the west, and presence of flood plain.</p> <p>This option was the most favoured in the consultation response, with 58% of respondents choosing Option 5 as their preferred option.</p> <p>All stakeholders responding to the consultation stated a preference for Option 5 in their responses.</p> <p>This option has a moderate impact on local businesses, particularly for the operation of the stables at Church Field Farm to the south of the existing A605</p>
Commercial Case	No significant issues at this stage
	<p>Would be funded through funding from Local Transport Board and Local Growth Fund alongside prudential borrowing and financial support from Network Rail and developers</p> <p>Scheme would be procured through OJEU tendering process and procured with standard ICE contract</p>

Appendix A: Major Scheme Checklist

Key Criteria	Location
Overall: How compelling is the case for the scheme?	
1) Is there evidence to show that there is a need for intervention?	
Has a scope for the scheme been defined?	The scope of this scheme is identified within the Strategic Case within Section 3.10
Have current problems been identified?	Current problems are identified within the Strategic Case within section 3.4 'The Need for Intervention'
Have problems in the future been identified?	Future problems are identified within Section 3.5 'Impact of No Intervention; 3.6 'Internal Drivers for Change; and 3.7 'External Drivers for Change'
Does the scheme address the problems?	Appraisal of the preferred scheme is located in the Economic Case within section 4.2
Have other opportunities for the scheme been identified?	Other opportunities for the scheme are identified within the Economic Case within Section 3.14
Is there a case to say why the scheme is needed now?	The need for the scheme now can be found within the Strategic Case under section 3.4 'The Need for Intervention'
2) Have objectives been appropriately defined?	
Do the objectives capture the context/problems which ground the need for the scheme?	The objectives of the Kings Dyke Crossing scheme can be found in Section 3.8 'Scheme Objectives'
Have the objectives been developed to align with the objectives and outlooks of national/sub-regional/local planning policies?	The development of scheme objectives in relation to national, regional and local policies can be seen within the Strategic Case in section 3.3 'Fit with the Wider Policy Context'
How well does the scheme align to the objectives?	The alignment of scheme objectives to national, regional and local policies can be found within Section 3.4 'Scheme Objectives'
3) Have alternative options been defined?	
What is the basis to the generation of alternative options?	The generation of alternative options is discussed within Section 3.14.
Is the case for the discounting of alternative options compelling?	Discounting of alternative options is located within Section 3.14. and 4.2
4) Does the case identify other factors affecting the suitability of the preferred option?	
Constraints	Constraints are identified and discussed within the Strategic Case Chapter under section 3.11 'Constraints'
Dependencies/ Interdependencies	Inter-dependencies can be found within the Strategic Case under section 3.12 whilst Project Dependencies can be found within the Management Case under section 7.3
5) Does the case identify risks affecting delivery of the scheme?	
Key Risks	Key risk associated with this scheme can be found within the Risk Register in Section 7.9
Stakeholder Awareness	A list of key stakeholders can be located within Section 7.7
Powers and Consents	Powers and Consents are discussed within the Management Case. Relevant letters of support are also included within Appendix 2.

Appendix B: Signed Letters of Support

- Letter from the Greater Cambridge Greater Peterborough Local Transport Body

Appendix C: Assessment Summary Tables

Assessment of Strategic Case - Qualitative score, rationale and comments

Intervention Objective	Option 5 Off Line Alignment to South
Improve journey time and congestion on the A605	Large Beneficial Significant journey time saving benefits North Bank Open - £12.0M North Bank Closed - £193.7M
Improve accessibility to Whittlesey from the west, increasing its attractiveness as a place to live, work and do business	Moderate Beneficial Assumed that level crossing would be closed Reduced delays and improved journey time reliability improve access between Whittlesey and Peterborough
Improve accessibility to employment premises to the north and south of the railway on Funtham's Lane	Slight Beneficial Accesses are in the existing locations, but off the proposed roundabouts. Roundabout may enable business traffic to enter/exit premises easier than existing priority junctions
Improve the reliability of rail services on the route between Ely and Peterborough by removing the incidents of level crossing strikes	Large Beneficial Level crossing will be closed/removed therefore all conflicts between road and rail removed
Improve the safety of both the road and rail networks with the removal of the level crossing	Large Beneficial Level crossing will be closed/removed therefore all conflicts between road and rail removed
Minimise the impacts of transport on the natural environment and seek solutions that deliver long-term environmental benefits	Moderate Adverse Environmentally there is a large beneficial impact with regards to noise and a neutral impact on greenhouse gases. However there are moderate or large adverse impacts on landscape, historic environment, biodiversity and water environment.
High Level Goals	Option 5 Off Line Alignment to South
Enable proposed housing and employment growth to be accommodated in Whittlesey and beyond	Large Beneficial Improved journey time reliability and reduced delays will ensure there is incentive to invest in Whittlesey and deliver housing and economic growth
Support the delivery of increased levels of passenger and freight trains on the Peterborough to Ely Line	Large Beneficial The removal of the crossing will mean that any increases in passenger or freight train movements will not have a negative impact on the travelling public between Whittlesey and Peterborough
Minimise the impact on the natural environment and views from surrounding landscape	Moderate Adverse See above assessment of intervention objective
Wider Policies	Option 5 Off Line Alignment to South
Spatial Planning Policies Fenland Local Plan (2014)	Large Beneficial Journey time reliability on A605 between Whittlesey and Peterborough improved as a result it supports the housing and economic growth aspirations for Whittlesey and Peterborough in the long-term
Wider Policies	Option 5 Off Line Alignment to South
Non Spatial policies National Planning Policy Framework Fenland Local Plan (2014)	Large Beneficial Strong compatibility in the context of themes relating to economic growth, and less compatible in the context of climate change, natural and historic environment themes

Assessment of Value for Money Case - Cost / impact, rationale and comments

Economy		Option 5 Off Line Alignment to South	
Business Users & transport providers - NPV	North Bank Open	North Bank Closed	
	-£4.1M	£177.5M	
Reliability impact on Business Users	PVB £12M (Moderate Beneficial)	PVB £193.7M (Large Beneficial)	
	Level crossing is removed and pinch point is removed, therefore journey time reliability is improved on the A605 between Whittlesey and Peterborough		
Regeneration	Neutral		
	No regeneration proposals within vicinity of scheme		
Loss of development land	Neutral		
	No development land within vicinity of scheme		
Other economic impacts - impact on local businesses	Moderate Adverse		
	<p>Option has a moderate adverse impact on Church Field Farm Stables as the proposed scheme would result in the loss of car parking for events, which in turn could impacts on the number and size of events the business could run, and therefore impact on the income of the business. In addition, the proposed scheme would split the site, with the paddocks and gallops located on the other side of the road to the stables, however this can be mitigated by providing a track and underpass between the stables and the paddocks to ensure access is maintained.</p> <p>The remaining businesses to the north and south of the A605 have minimal, if any impact. The businesses to the north may have a benefit with regards to access/egress from Funtham's lane, as the provision of roundabouts at either end of the scheme providing a break in the traffic.</p>		

Environment	Option 5 Off Line Alignment to South
Noise	<p>Large Beneficial</p> <p>NPV £71,546</p> <p>Minimal change with regards to noise for majority of local residents, however 1-2 households will have a benefit noise levels</p>
Air Quality	<p>Neutral</p> <p>The expected changes in traffic flows between options are likely to be very small. Given the location of the scheme, the existing air quality in the area, the proposed designs and the likely changes in flows of the three options the results of a detailed air quality assessment between options would be very similar and add little value to the selection of a single option. On this basis the air quality will be reviewed at the single option appraisal stage and the results reported as part of the planning application submission.</p>
Greenhouse Gases	<p>Neutral</p> <p>NPV = £0</p> <p>Unlikely to be a change in greenhouse gas levels as the change in the length of the route is minimal.</p> <p>Reduced queuing and congestion is likely to result in a slight improvement in greenhouse gases</p>
Landscape /Townscape	<p>Landscape Character – Moderate Adverse (Neutral after mitigation planting)</p> <p>Strong adverse impact for visual amenity of residents in the cottage on A605 to north-east of level crossing, two properties to north of A605 Funtham’s Lane junction and for users of the byway along Kings Dyke Drain in Year 1. In year 15 proposed mitigation planting will reduce the visual impacts to non-significant.</p> <p>In future this impact will become Neutral, as this option will allow for mitigation to soften the look of the new infrastructure and help it to blend with its surroundings. However two new roundabouts will remain visually intrusive for residents.</p> <p>However, it is worth noting that the area in the immediate vicinity of the scheme has a long history of industrial use/landscape.</p>
Historic Environment	<p>Moderate Adverse</p> <p>Removal of made ground for embankment construction would entirely remove archaeology remains within the ground and expose any archaeology remains beneath made ground. In addition piling would remove any archaeology within the footprint of each pile as it is driven downwards</p> <p>An archaeological evaluation is required to understand the presence, nature and significance of archaeology in the study area</p>
Biodiversity/Ecology	<p>Moderate Adverse</p> <p>Impact on small pockets of rough grassland and potential loss of trees, shrubs and hedgerows on either side of A605</p> <p>The route crosses a proven reptile (grass snake, common lizard and slow worms) habitat.</p> <p>Greatest impact on breeding bird habitat, route crosses areas where the Little Ringed Plover have bred</p> <p>If Star Lake Pit is affected, could be impact on water voles and invertebrate habitat</p>
Water Environment	<p>Slight Adverse</p> <p>This option would reduce the capacity for flooding in the flood plain. However there is unlikely to be impacts on water quality.</p>

Social	Option 5 Off Line Alignment to South	
Commuting and other transport users and transport providers - NPV	North Bank Open	North Bank Closed
	-£4.1M	£177.5M
Reliability impact on commuting and other users	PVB £12M (Moderate Beneficial)	PVB £193.7M (Large Beneficial)
	Improved journey time reliability for commuters and users travelling between Whittlesey and Peterborough	
Physical activity	Neutral	
	The scheme will include infrastructure for walking and cycling however this will be a replacement for the existing infrastructure in place.	
Journey quality	Large Beneficial	
	Driver's frustration caused by unreliable journey times is likely to be reduced significantly as the crossing is removed. Overall improvement in safety. Over 11,000 drivers per day affected.	
Accidents	Moderate Beneficial	
	Enables level crossing to be removed, removing associated safety risks	
Personal security	Neutral	
	Footways and cycleways along the new route are considered to have low footfall, however issues of personal security should be considered as part of the detailed design of the scheme.	
Access to the transport system	Slight Beneficial	
	No significant improvements in accessibility to the transport network, however bus journeys and train journeys will be more reliable	
Affordability	Neutral	
	No specific changes to the cost of travel (public transport fares, road user pricing or car parking increases).	
Severance	Slight Beneficial	
	No change to potential severance issues residents may have. However queuing in the area will be reduced Roundabouts at both ends of the proposed route, and therefore this may aid people in crossing the road, reducing the severance between the two sides of the A605	
Option Values	Neutral	
	Not Applicable	
Public Accounts	Option 5 Off Line Alignment to South	
Cost to broad transport budget	£14.1M	
Benefit Cost Ratio	Option 5 Off Line Alignment to South	
	North Bank Open	North Bank Closed
Present Value of Benefits	£12.1M	£193.8M
Present Value of Costs	£14.1M	£14.1M
BCR	0.85	13.74
SDIs	Option 5 Off Line Alignment to South	
Social and distributional impacts on potential vulnerable groups	No significant adverse SDI effects on vulnerable groups	

Assessment of Financial Case

Capital and Revenue Costs	Option 5 Off Line Alignment to South
Outturn cost to implement (including 2.5% inflation)	£16,910 million

Assessment of Delivery Case – Qualitative score, rationale and comments

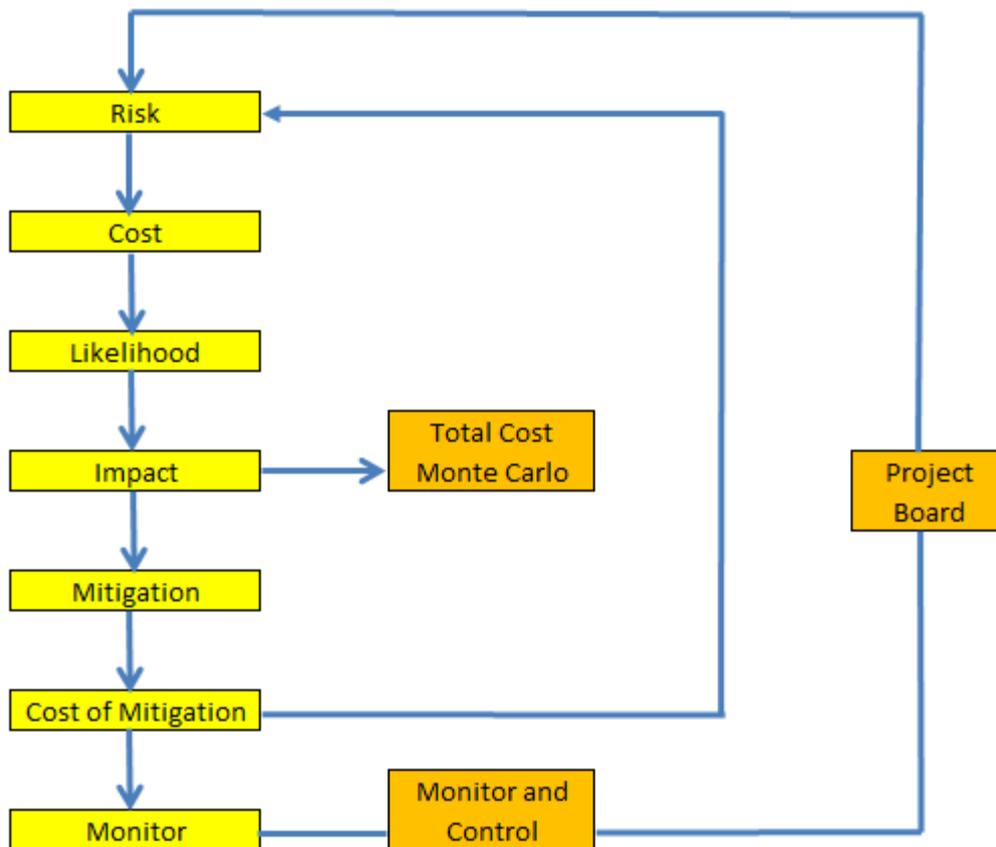
Social	Option 5 Off Line Alignment to South
Buildability	<p>Some buildability issues</p> <p>Potentially very poor ground conditions (peat) – may require foundations to the approach road earth embankment</p> <p>Construction in close proximity to existing open clay pit to the east and filled in clay pit to the west, also construction in flood plain.</p> <p>Not building over existing signal box</p>
Disruption during construction	<p>No significant disruption</p> <p>Off-line construction</p>
Operational Viability	<p>Operationally Viable</p> <p>Would enable the level crossing to be closed to all traffic, with the road to the crossing remaining in operation but only to service those vehicles that need to access premises and properties</p>
Likely delivery agents – complexity of partnership	<p>Low Complexity</p> <p>Cambridgeshire County Council, Fenland District Council and Network Rail would need to organize possessions to close line for up to 52 hours which generally requires two years notice</p>
Stakeholder and Public Acceptability	<p>Most Favoured Option</p> <p>58% of respondents favoured this options.</p> <p>All of the stakeholder responses stated a preference for Option 5</p>
Impact on Local Businesses	<p>Moderate Adverse</p> <p>Option has a moderate adverse impact on Church Field Farm Stables as the proposed scheme would result in the loss of car parking for events, which in turn could impacts on the number and size of events the business could run, and therefore impact on the income of the business. In addition, the proposed scheme would split the site, with the paddocks and gallops located on the other side of the road to the stables, however this can be mitigated by providing a track and underpass between the stables and the paddocks to ensure access is maintained.</p> <p>The remaining businesses to the north and south of the A605 have minimal, if any impact. The businesses to the north may have a benefit with regards to access/egress from Funtham's lane, as the provision of roundabouts at either end of the scheme providing a break in the traffic.</p>

Assessment of Commercial Case

Social	Option 5 Off Line Alignment to South
Funding	Viable funding sources
	Funding from Local Transport Body and Local Growth Fund, alongside prudential borrowing and financial support from Network Rail and developers
Procurement Process	No significant issues
	Scheme would be procured through an OJEU tendering process and procured with a standard ICE contract.
	Environmental considerations may increase risk pricing by contractors.
Level of Market Interest	Neutral
	Not yet tested

Appendix D: Risk Registers

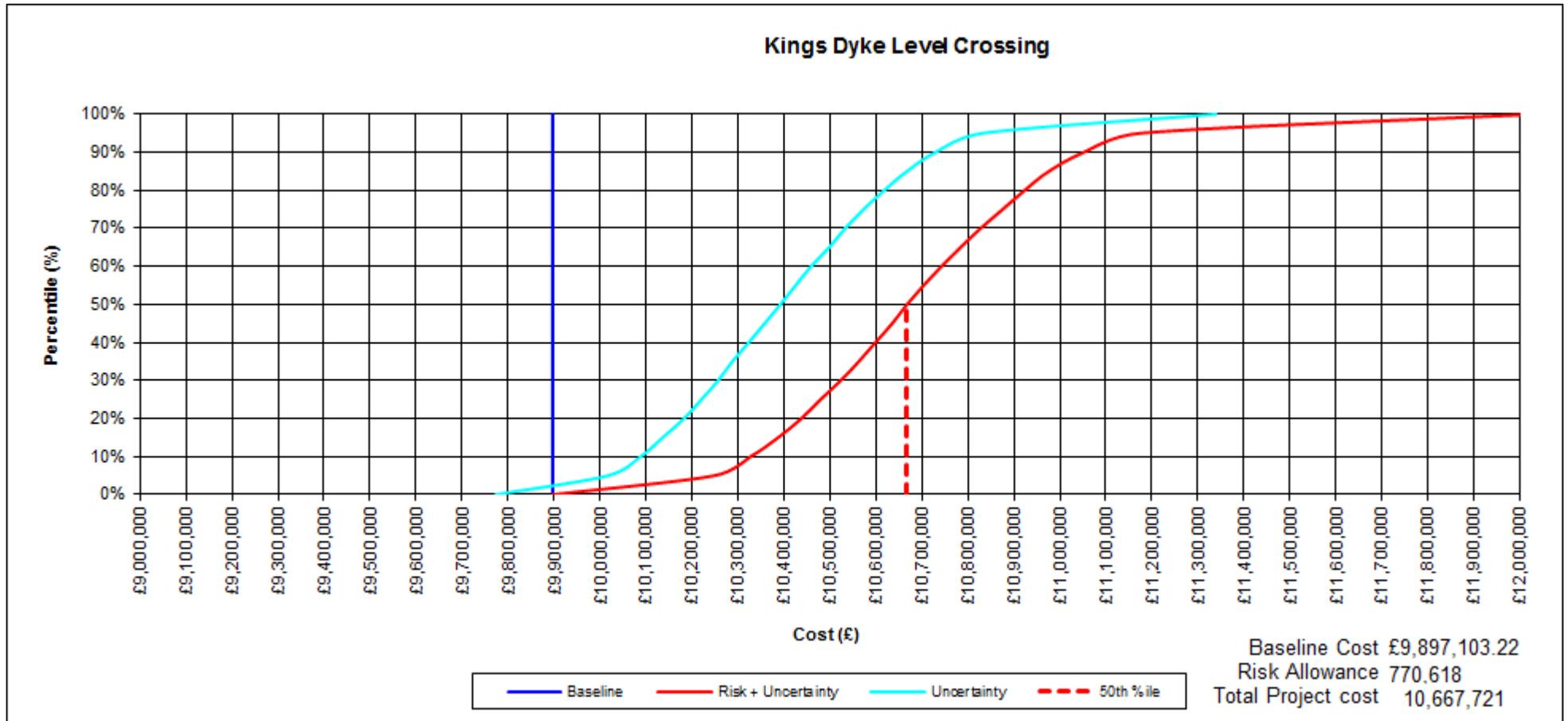
Risk Management Strategy



Quantified Risk Assessment

Kings Dyke Level Crossing									
No	Description	Likelihood	Impact		Minimum Cost (£)	Most Likely Cost (£)	Maximum Cost (£)	Random	On / Off
			Cost	Time					
1	Inadequate consultation with non-statutory consultees	15.0%	L	N/A	£2,500.00	£5,000.00	£10,000.00	71%	0
2	Inadequate consultation with statutory consultees	10.0%	VL	N/A	£2,500.00	£7,500.00	£15,000.00	74%	0
3	Public enquiry is needed	25.0%	VH	N/A	£75,000.00	£100,000.00	£125,000.00	38%	1
4	Scope change during design	50.0%	M	N/A	£5,000.00	£25,000.00	£35,000.00	1%	1
5	Prolongation of tender period	20.0%	L	N/A	£3,000.00	£5,000.00	£12,500.00	59%	0
6	Design errors found during construction	25.0%	M	N/A	£2,500.00	£10,000.00	£25,000.00	15%	1
7	Inadequate programme allowance for EIA	20.0%	L	N/A	£3,800.00	£10,000.00	£15,000.00	76%	0
8	Additional surveys required to address planning queries	20.0%	L	N/A	£1,500.00	£5,000.00	£7,500.00	26%	0
9	Re-design to address planning issues	10.0%	VL	N/A	£5,000.00	£25,000.00	£35,000.00	13%	0
10	Flood Risk Assessment findings - additional culverts etc	25.0%	M	N/A	£5,000.00	£10,000.00	£15,000.00	53%	0
11	Network Rail access - Bailey bridge required?	30.0%	M	N/A	£60,000.00	£75,000.00	£87,500.00	42%	0
12	Ecology - larger culverts required	30.0%	M	N/A	£2,500.00	£5,000.00	£7,500.00	6%	1
13	Ecology - mitigation cost and delays to construction	50.0%	M	N/A	£25,000.00	£50,000.00	£62,500.00	80%	0
14	Drainage discharge consent influences design	40.0%	M	N/A	£2,500.00	£5,000.00	£10,000.00	83%	0
15	dge headroom - rail, river, footways, accesses influences des	20.0%	L	N/A	£5,000.00	£10,000.00	£15,000.00	16%	1
16	programme delays due to late info & approval of design by 3rd pa	30.0%	M	N/A	£5,000.00	£15,000.00	£25,000.00	38%	0
17	Rail possessions affect works programme	30.0%	M	N/A	£20,000.00	£30,000.00	£40,000.00	63%	0
18	SU service diversions affect works programme	50.0%	M	N/A	£5,000.00	£15,000.00	£25,000.00	53%	0
19	EA and IDB requirements alter design assumptions	30.0%	M	N/A	£2,500.00	£5,000.00	£7,500.00	32%	0
20	Groundwater contamination from highway drainage	15.0%	L	N/A	£12,500.00	£25,000.00	£37,500.00	17%	0
21	Departures from Standard required	40.0%	M	N/A	£1,500.00	£2,500.00	£4,000.00	96%	0
22	RSA recommendations alter the design	40.0%	M	N/A	£2,500.00	£5,000.00	£7,500.00	16%	1
23	Unforeseen ground conditions	50.0%	M	N/A	£7,500.00	£20,000.00	£30,000.00	3%	1
24	Contaminated ground	15.0%	L	N/A	£2,500.00	£7,500.00	£12,500.00	31%	0
25	Change of Council policy delays scheme	20.0%	L	N/A	£5,000.00	£10,000.00	£15,000.00	79%	0
26	New services required on bypass - late notification by SU s.	20.0%	L	N/A	£2,500.00	£5,000.00	£10,000.00	9%	1
27	Challenge to CPOs	10.0%	VL	N/A	£15,000.00	£22,500.00	£25,000.00	8%	1
28	Errors & omissions in contract documents - contract CE s	15.0%	L	N/A	£20,000.00	£50,000.00	£62,500.00	65%	0
29	Settlement of Network Rail line adjacent to new embankment	20.0%	L	N/A	£50,000.00	£75,000.00	£90,000.00	68%	0
30	Inadequate temporary access roads - delays to works	20.0%	L	N/A	£15,000.00	£25,000.00	£35,000.00	10%	1
31	Availability of large volumes of fill material	20.0%	L	N/A	£15,000.00	£25,000.00	£35,000.00	71%	0
32	Flooding of site	50.0%	M	N/A	£25,000.00	£37,500.00	£50,000.00	7%	1
33	Exceptional weather conditions - delays to works	20.0%	L	N/A	£15,000.00	£50,000.00	£75,000.00	8%	1
34	GI cannot be completed until work commences	90.0%	VH	N/A	£5,000.00	£15,000.00	£25,000.00	63%	1
35	Land entry delays	10.0%	VL	N/A	£23,000.00	£27,500.00	£37,500.00	11%	0
36	CPO does not identify all land requirements	20.0%	L	N/A	£5,000.00	£10,000.00	£15,000.00	91%	0
37	On-site archeology required during construction	15.0%	L	N/A	£15,000.00	£25,000.00	£35,000.00	61%	0
38	Blight notices - additional accommodation works needed	10.0%	VL	N/A	£2,500.00	£7,500.00	£12,500.00	0%	1
39	Advance works not identified or carried out soon enough	10.0%	VL	N/A	£15,000.00	£25,000.00	£35,000.00	37%	0
40	Inaccurate estimating	20.0%	L	N/A	£250,000.00	£250,000.00	£500,000.00	33%	0
41	Legal review of EIA	10.0%	VL	N/A	£2,500.00	£7,500.00	£15,000.00	87%	0
42	Use rail transport for bulk deliveries	15.0%	L	N/A	£175,000.00	£125,000.00	£0.00	9%	1
43	Network Rail upgrade affects site access	20.0%	L	N/A	£15,000.00	£50,000.00	£75,000.00	73%	0
44	Maintain access for landowners during construction	25.0%	M	N/A	£2,500.00	£5,000.00	£7,500.00	9%	1
45	Missed opportunity for funding from 3rd parties	10.0%	VL	N/A	£50,000.00	£250,000.00	£500,000.00	62%	0
46	Prosecution for injury to protected species	5.0%	VL	N/A	£5,000.00	£12,500.00	£15,000.00	12%	0
47	Piling adjacent to railway affects NR equipment	15.0%	L	N/A	£25,000.00	£50,000.00	£75,000.00	80%	0
					£162,800.00	£1,382,500.00	£2,411,500.00		
<p>Note: Highlighted figures are results of a single outcome from the uncertainty and risk sections of the scheme model. Monte Carlo analysis uses 1000 iterations and the full range of possible outcomes is graphed on the attached S-curve. In accordance with HA Guidance Note GN 02/03, the 50% Confidence Level figures from this analysis are to be used to set budget estimate figures.</p>									

Quantified Risk Assessment



Appendix F: Section 151 Officer Sign-off

Appendix G: Assessment Summary Sheets

This appendix provides the following AST worksheets for each of the potential options:

- Transport Economic Efficiency (TEE)
- Public Accounts (PA)
- Analysis of Monetised Costs and Benefits (AMCB)
- Appraisal Cost Proforma (updated).

This appendix provides the following AST worksheets for each of the potential options:

Transport Economic Efficiency (TEE) – Shows the transport benefits to consumers (commuting and other trip purposes) and business (business users of transport and benefits to private sector transport providers). Also includes entries for the disbenefits (delays, increased vehicle operating costs and increased numbers of accidents) to transport users caused by construction and maintenance. The results are summed to give the total Net Present Value (NPV) of non-government benefits.

It is important to note that benefits to business and consumers are restricted to those benefits that are calculable from changes within the transport system. They do not include reliability benefits, benefits due to changes in land use or values, productivity and so on arising from a transport proposal. Such benefits are reported separately in Chapter 5.

- **Public Accounts (PA)** – Presents the costs and revenues for local and central government. The analysis leads to a NPV of costs to central and local government
- **Analysis of Monetised Costs and Benefits (AMCB)** – Presents summary statistics, such as NPV and BCR. These statistics draw on the results presented in the Public Accounts and Transport Economic Efficiency table, and, where appropriate, any other analyses that provide a monetised estimate of benefit. This table includes a warning that, where there are significant benefits or disbenefits that have not been monetised, the summary statistics presented may not be a good indicator of value for money and should not be used alone in taking decisions.
- **Appraisal Cost Proforma** – Sets out costs used in the economic appraisal of options.

Transport Economic Efficiency (TEE) Table – Bypass Route B (£, 000s, 2012 prices discounted to 2010)

Economic Efficiency of the Transport System (TEE)				
TOTAL		<i>Open</i>	North Bank <i>Closed</i>	<i>Average</i>
Present Value of Transport Economic Efficiency Benefits				
	Level			
	Crossing	24,944	223,503	54,728
	Roundabouts	-12,916	-29,800	-15,449
Efficiency Benefits (TEE)		12,028	193,703	39,279

Note: all entries are present values discounted to 2010 in 2010 market prices

Economic Efficiency of the Transport System (TEE)

Non-business: Commuting		ALL MODES	ROAD	BUS and COACH	RAIL	OTHER	
<i>User benefits</i>		TOTAL	Private Cars and LGVs	Passengers	Passengers		
Travel time		5,470	5,277	192			
Vehicle operating costs							
User charges							
During Construction & Maintenance							
NET NON-BUSINESS BENEFITS: COMMUTING		5,470	(1a) 5,277	192			
Non-business: Other		ALL MODES	ROAD	BUS and COACH	RAIL	OTHER	
<i>User benefits</i>		TOTAL	Private Cars and LGVs	Passengers	Passengers		
Travel time		16,339	15,683	656			
Vehicle operating costs							
User charges							
During Construction & Maintenance							
NET NON-BUSINESS BENEFITS: OTHER		16,339	(1b)				
Business			Goods Vehicles	Business Cars & LGVs	Passengers	Freight	Passengers
<i>User benefits</i>							
Travel time		17,470	7,894	9,341	236		
Vehicle operating costs							
User charges							
During Construction & Maintenance							
Subtotal		17,470	(2)				
Private sector provider impacts					Freight	Passengers	
Revenue							
Operating costs							
Investment costs							
Grant/subsidy							
Subtotal			(3)				
Other business impacts							
Developer contributions			(4)				
NET BUSINESS IMPACT		39,279	(5) = (2) + (3) + (4)				
TOTAL							
Present Value of Transport Economic Efficiency Benefits (TEE)		39,279	(6) = (1a) + (1b) + (5)				

Notes: Benefits appear as positive numbers, while costs appear as negative numbers.
All entries are discounted present values, in 2010 prices and values

Public Accounts (PA) Table – Bypass Route B (£, 000s, 2012 prices discounted to 2010)

Public Accounts		
	ALL MODES TOTAL	Road
Local Government Funding		
Investment Costs	14,096	14,096
Developer Contributions	0	
Grant/subsidy Payments	0	0
NET IMPACT	<u>14,096</u>	<u>14,096</u>
TOTAL		
Broad Transport Budget	14,096	
Present Value of Costs	14,096	

Note: all entries are present values discounted to 2010 in 2010 market prices

Public Accounts (PA) Table

	ALL MODES	ROAD	BUS and COACH	RAIL	OTHER
Local Government Funding	TOTAL	INFRASTRUCTURE			
Revenue					
Operating Costs					
Investment Costs	14,096		14,096		
Developer and Other Contributions					
Grant/Subsidy Payments					
NET IMPACT	(7)				
Central Government Funding: Transport					
Revenue					
Operating costs					
Investment Costs					
Developer and Other Contributions					
Grant/Subsidy Payments					
NET IMPACT	(8)				
Central Government Funding: Non-Transport					
Indirect Tax Revenues	(9)				
TOTALS					
Broad Transport Budget	14,096	(10) = (7) + (8)			
Wider Public Finances		(11) = (9)			

Notes: Costs appear as positive numbers, while revenues and 'Developer and Other Contributions' appear as negative numbers.
All entries are discounted present values in 2010 prices and values.

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Analysis of Monetised Costs and Benefits (AMCB) Bypass Route B (£, 000's, 2012 prices discounted to 2010)

Analysis of Monetised Costs and Benefits				
[Standard BCR Calculation]				
		North Bank		
		<i>Open</i>	<i>Closed</i>	
			<i>Average</i>	
	Present Value of Benefits	12,028	193,703	39,279
	Broad Transport Budget	14,096	14,096	14,096
	Net Present Value of Costs (PVC)	14,096	14,096	14,096
OVERALL IMPACT				
	Net Present Value (NPV)	-2,068	179,607	25,183
	Benefit to Cost Ratio (BCR)	0.85	13.74	2.79

Note: all entries are present values discounted to 2010 in 2010 market prices

Analysis of Monetised Costs and Benefits

Noise		(12)
Local Air Quality		(13)
Greenhouse Gases		(14)
Journey Quality		(15)
Physical Activity		(16)
Accidents		(17)
Economic Efficiency: Consumer Users (Commuting)	5,470	(1a)
Economic Efficiency: Consumer Users (Other)	16,339	(1b)
Economic Efficiency: Business Users and Providers	17,470	(5)
Wider Public Finances (Indirect Taxation Revenues)	0	(11) - sign changed from PA table, as PA table represents costs, not benefits
Present Value of Benefits (see notes) (PVB)	39,279	(PVB) = (12) + (13) + (14) + (15) + (16) + (17) + (1a) + (1b) + (5) - (11)
Broad Transport Budget	14,096	(10)
Present Value of Costs (see notes) (PVC)	14,096	(PVC) = (10)
OVERALL IMPACTS		
Net Present Value (NPV)	25,183	NPV=PVB-PVC
Benefit to Cost Ratio (BCR)	2.79	BCR=PVB/PVC

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

Appraisal Cost Proforma Summary Sheet – Bypass Route B

Assumptions: Do-minimum cost of maintaining the level crossing, which are avoided with this option, have not been deducted from these figures

Appraisal Cost Proforma Summary Sheet

Assumptions:

Price Year Base (Earliest - 1998)	2015
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Note: Promoters are requested to enter the price year base they are using into the above

Investment cost optimism bias (%)	32
Operating cost optimism bias (%)	0

QRA P(80) (total)	1,026,389
QRA P(50) (total)	770,618
Design Year Operating Cost (usually 15 years from opening year)	12
Operating Cost (all years total)	3,490

COST BREAKDOWN:

All values in £,000's (thousands)

Financial Year	Investment Cost (in price year base in cell C3, excluding risk)	Cost including real cost inflation (Base Cost)	Risk adjusted cost using QRA P (mean)	Risk adjusted cost including Optimism Bias	Risk adjusted cost including OB deflated and discounted to 2010 Market Prices
2011/12	0	0	0	0	Sunk
2012/13	0	0	0	0	Sunk
2013/14	0	0	0	0	Sunk
2014/15	262	269	288	381	289
2015/16	5,780	6,065	6,511	8,595	6,303
2016/17	3,855	4,144	4,449	5,873	4,161
2017/18	0	0	0	0	0

Totals for remaining appraisal years:

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Totals:	9,897	10,478	11,249	14,848	10,753
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