

Project information

Title	A47 North Tuddenham to Easton			
Stage	Full (FBC) Business Case			
Authority requested	This business case supports the request for formal approval from NH IC July 2024 to approve the revised scheme budget and approve the award of Notice to Proceed, subject to the usual Governance gateways and award of the DCO.			
Senior responsible owner (SRO)	[REDACTED]			
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Functional advisors | business partners

Name	Role	Date of issue	Version
Subject matter advisors (SMAs) by function – see next table			
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[REDACTED]	Environment	13/09/23	004
[REDACTED]	Human Resources	13/09/23	004
[REDACTED]	Safety Engineering and Standards (other)	13/09/23	004

Subject matter advisors (SMAs)

Name	Role	Date of issue	Version
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[REDACTED]	Economic SMA	13/09/23	004
[REDACTED]	Commercial and Procurement SMA	13/09/23	004
[REDACTED]	Finance SMA	13/09/23	004
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Introduction

1. Executive summary

1.1 Recommendation

This Final Business Case (FBC) documents the strategic, economic, financial, commercial and management cases for this project. It represents the latest business case for the scheme, using the latest model and cost information available to demonstrate Value for Money (VfM) and support approval of the investment required to fund the construction of the scheme. It has been prepared in accordance with the guidance set in National Highway's Project Control Framework (PCF) and Department for Transport's guidance on the assessment of major investments. In addition, this document provides evidence that the recommended solution can be delivered by National Highways, its integrated Delivery Team and their suppliers, with a managed level of risk.

The DIP has been contracted to deliver the scheme in full with the TOC expected to be [REDACTED] and agreed before Notice to Proceed.

The project contributes towards the wider objectives of National Highway's Strategic Business Plan, presents Medium Value for Money and has a BCR of 1.89.

The scheme is currently undertaking advanced works. During the Judicial Review, a court decision following the appeal was received in February 24, with the judges ruling again against the claimant. An appeal to the Supreme Court was made and that was rejected in May 2024. The recommendation is that the Full Business Case is approved.

1.2 What is the latest information on financing this proposal?

Current DIP budget is being negotiated and will be dependent on agreement of outstanding CEs to inform the final budget position. The budget will be agreed and confirmed at NTP.

The Scheme was first announced in the Roads Investment Strategy (RIS) 1.

On 11 March 2020, the Government published its second Road Investment Strategy for the period 2020-2025 (RIS2). Part 3: The Investment Plan sets out the Government's expenditure priorities which confirms the ongoing commitment to the scheme.

IDC approvals have been granted at each stage and the latest IDC approval request set out below. The TOC was set at £127m in 2019. In early PCF Stage 3, it was identified that the two at grade junctions will not work and the design changed to elevated junctions with bridges and roundabouts. This change was agreed in 2021 December and the TOC were provisionally agreed to £195m with IDC approval.

The commercial estimates were refreshed to account for inflation, the legal challenge delay, changes to the NR VAT etc.

Prolongation costs and inflation numbers have been calculated however commercial negotiations are still ongoing with the DIP. The revised commercial estimate from May 2024 is inclusive of these costs has a most likely figure is [REDACTED].

Affordability Profiles (£m)	Version	Date	Prior Years	Road Period 2					Road Period 3					BP2	BP3	Future Years	Total Project Cost
				20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29	29/30				
Capital Baseline	4.2	Mar-24															
Current Operational Plan (inc CRR drawdown)	4.2.4	Jun-24															
Project Manager's current forecast			Jun-24														
Current forecast vs Capital Baseline																	
Current forecast vs Operational Plan																	
Funding Approvals (£m)																	
Funding previously approved by IDC		Sep-23															
Funding requested in this investment submission		Jan-00															
Total funding approved after this investment decision		Jan-00															
Actual spend to date			Jun-24														
Current forecast vs Total funding approved																	
CRR (drawdown) / handed back: previously																	
Additional Information (£m)																	
PM's forecast before third party contribution																	
Third party contribution																	
Project Manager's current forecast (cost to NH)			Jun-24														
Current Commercial Estimate		May-24															
Forecast vs Commercial Estimate																	

1.3 What is the proposal trying to achieve?

KPI	CR	KPI	CR
The number of killed or serious injuries (KSIs) on the strategic road network (SRN)	G	Average delay: difference between the observed travel time and the speed limit travel time (seconds per vehicle per mile)	G
Network availability: percentage of the network free from traffic restrictions owing to roadworks	G	Incident management: percentage of incidents cleared within one hour, based on 24 hour coverage	G
Pavement condition: the percentage of pavement asset that does not require further investigation for possible maintenance	A	Noise	A
Biodiversity	A	Air quality	G
National Highways carbon emissions	R	Road user satisfaction: measured using the strategic road user survey (SRUS)	
Roadworks information timeliness and accuracy		Efficiency	

CR = confidence rating. Key: R – concern, A – limited, G – positive.

RIS commitments other	Description	CR
Capability	DIP in contract, Project Delivery Plan and Project Quality Plan in place. Resource Plan in place to deliver scheme. NH team in place to deliver scheme.	Green
Deliver to budget	Budget to be agreed with the DIP	Amber

1.4 What options have been considered?

Preferred Route Announcement made during Stage 2 as outlined in A47 North Tuddenham to Easton Stage 2 Business Case where further details can be found in item 2.3.5.

A Technical Appraisal Report (TAR) for the route was completed within Project Control Framework (PCF) Stage 1 (Options Identification Stage), in November 2016. A total of 14 options were identified with 4 options developed in further detail for the TAR.

Further development of the 4 options meant that the four options were suitable to take forward. One option was costed to provide a suitable baseline for the four options to continue development and assessment. Following the Options Estimate, the option was deemed to be too expensive. A value engineering exercise was undertaken to reduce the overall baseline cost. The four options were presented to the PCF Stage 1 Investment Decision Committee (IDC) in December, and it was decided that the four options could go through to Non statutory public consultation.

Options estimates issued in June 2017 for the costed option, give a most likely cost of £138.8M including portfolio risk and a BCR of 1.73.

The A47 North Tuddenham to Easton dualling scheme PCF Stage 2 Brief was issued in October 2016. The detailed Brief set out the scope of works for PCF Stage 2, Options Selection and the Commissioning Report outlines the approach to delivering the PCF Stage 2 Brief.

The historic options and the options assessment following the non-statutory public consultation in 2017 have been described in section 2.3.5.

1.5 How will you go about delivering it?

Procurement of a Delivery Integrated Partner (DIP) has been completed, with partners announced in November 2018. The Delivery Integration Partner (DIP) for Stages 3 to 7 is Galliford Try (GT) for the A47 schemes. GT completed mobilisation and agreed the framework and scheme contracts in September 2019 and have appointed SWECO as the Design Partner for the scheme. The A47 Programme used the Regional Delivery Partnership (RDP) to procure the 'Delivery Integration' Partner (DIP). The procurement strategy which was followed is set out in Section 4.2, Diagram 4.1.

The contract awarded sets a budget for the Development and Construction Phases with efficiencies included in the budget set to ensure that the NH efficiency target is achieved for the scheme through this procurement route. The TOC will be amended to be in line with the total funds available for the scheme and derive from the commercial estimate completed in May 2024.

A revised TOC will be agreed with the DIP as required by the contract to include the effect of Deed of Variation (DOV) 1 & 2 changes and associated NR VAT.

NH procured Technical Advisors (TA) to support the scheme providing assurances including the scheme design and the BCR. The TA was procured under a Collaborative Delivery Framework (CDF) contract with value for each PCF stage being agreed in advance. The TA started supporting the project in November 2019. The TA identifies the high-risk areas of the scheme through the agreed Technical Risk Assessed Table process.

The project uses the CEMAR software to administer the contract.

Efficiencies for the scheme are managed through the digital efficiency register process submitted monthly by the DIP identifying any efficiencies to cost and or time specifically. Within the RDP contract the primary efficiencies are embedded within the TOC with further efficiencies to be identified and delivered within Stage 6.

Supplier performance is measured using the Collaborative Performance Framework (CPF) process. Submissions are quarterly made by the DIP with evidence that is assessed and agreed with NH against performance criteria.

1.6 What is your project/programme governance arrangement?

The Regional Investment Programme (RIP) uses a committee structure which provides monthly forums in which project issues can be reviewed and escalated where necessary. Projects raise issues and discussion points at the Project Committees. Any items deemed to require escalation are raised to the Programme Committee by the Sponsor. This forum is also meant to help maintain the project on Budget using Earned Value Management (EVM) and KPIs to monitor project progress against commitments.

To ensure that the project undergoes quality assurance throughout the project lifecycle, NH quality practices and procedures are adhered to. Stage Gate Assessment Reviews (SGAR) are undertaken to ensure that the products for the stage have been approved and signed off by the relevant sign off authority. Only once all PCF products are completed for that's stage then the scheme can move into the next stage. SGARs are conducted internally by the Project Sponsor and the PCF Management team.

Independent Assurance Reviews (IARs) and Project Assurance Reviews (PARs) using the Infrastructure Projects Authority's Assurance Review process are conducted by experienced and impartial reviewers. The purpose of the IAR or PAR is to provide assurance and support to the Senior Responsible Owner that:

- Suitable skills and experience are deployed on the project
- All stakeholders understand the project status and issues
- There is assurance that the project can progress to the next phase
- Time and cost targets have a realistic basis
- The project team are gaining input from appropriate stakeholders
- Lessons are learned

1.7 What are the main risks, legal and regulatory impacts?

Threats and opportunities are managed in line with the NH Risk Management Plan. Risks and mitigating measures are reviewed monthly with risk workshops held quarterly. Key risks are discussed and escalated, if necessary, through Project Committees. The Risk Register is continually reviewed, and actions assessed on a regular basis by the integrated project teams and individual risk owners using Xactium as the tool for the register. The NH Project Manager is accountable for the process being managed with either the Client, Contractor or both being responsible for the risks within the register and their mitigations.

Top risks can be found in the table below

	Risk Title/Cause	Risk Event	Risk Impact	Risk Action Plan
1	R47867 - Topsoil Quality - Nutrient High Topsoil removed during early archaeological works and other soil removal across the duration of the scheme is of too high nutrient value to support a low nutrient/low maintenance planting regime (agricultural land treated to be nutrient high for crops).	There is a risk that topsoil removed may be unsuitable to reinstate.	Additional cost of disposal Additional cost to import new topsoil	<ul style="list-style-type: none"> • Trial panels to be set up in specific segregated planting areas to monitor reduction in nitrates by plants. • Monitor trial panels for effectiveness in reduction of nitrates at intervals across the life of the scheme.

2	<p>R20928 - Unanticipated Extreme Weather Conditions</p> <p>Unexpected extreme weather conditions over & above the agreed level stated in the contract as per agreed weather station</p>	<p>There is a risk of delay, prolongation or damage to works completed / underway due to an unexpected weather event</p>	<ol style="list-style-type: none"> 1. Delay to works 2. Additional cost 3. Potential remediation 4. Risk of repetition of flooding experienced 2023/24 5. Reputational impact of the above if perceived flooding is caused by the scheme. 	<ul style="list-style-type: none"> • Programme activities to most suitable time of year & maintain awareness of weather trends / forecasts • Review past weather trends • Installation of haul roads in area of high risk of flooding • Installation of pre-earthworks drainage to prevent damage to permanent works • Planning bulk earthworks for the right times of the year to be most efficient
3	<p>R48272 - ISSUE: Oak Farm Flood Bund – Construction</p> <p>Flood bund is no longer considered having reservoir status (as defined in the Reservoirs Act 1975) but some necessary elements of redesign to achieve this will be more costly than original design. Final design and cost still to be understood.</p>	<p>ISSUE: There is a risk of increased costs to construct the flood bund to remove the reservoir status.</p>	<p>Additional costs to the scheme.</p>	<ul style="list-style-type: none"> • Check whether change to reservoir status constitutes a material change to the DCO • Panel engineer to produce design and report • Matt to obtain a briefing from Barrie A (SWECO) to better understand the revised design to remove the reservoir standards, and impacts. • SWECO reviewing flood bund design internally
4	<p>R50943 - Increase in Bat surveys and assessments</p> <p>Amended legislation in 2023 changing how trees are assessed</p>	<p>There is a risk of increase in bat surveys and assessments required.</p>	<ol style="list-style-type: none"> 1. Additional cost of mitigation measures. 2. Additional time to complete mitigation. 3. Impact to vegetation clearance activities. 4. Delays to construction activities. 	<ul style="list-style-type: none"> • Surveys to be undertaken to assess the position - may mean more trees have to be added to the licence.
5	<p>R50297 - Issue: Drainage Design Post Design Fix E</p> <p>Drainage design E has evolved and more elements added such as culverts and headwalls.</p>	<p>ISSUE: There is a risk of drainage costs exceeding what was expected at the last design fix.</p>	<p>Additional costs to the scheme.</p>	<ul style="list-style-type: none"> • Review and update take off of drainage design

The scheme is being progressed under the DCO Planning Act route.

1.8 Is Cabinet Office and/or His Majesty's Treasury (HMT) approval involved?

Yes – Statutory undertakers National Gas diversion and Anglian Water diversion single contract values >£3m require the project to seek HMT governance for these diversions.

1.8.1 Cabinet Office

Commercial	Over £20m - contract / task order / Framework or extension Discuss with your C&P lead. i	<input checked="" type="checkbox"/>	N/A
	<p>The Tuddenham scheme was contracted through RDP to Galliford Try in September 2019. The Supplier has agreed DOV 1, DOV 2 and DOV3 however they haven't as of yet signed up to DOV4.</p> <p>The Delivery Integrated Partner (DIP) is in contract to deliver the scheme as part of the RDP contract. The DIP budget for the scheme as agreed in July 2023 was estimated to be in the region of £275.01m. Since then the scheme has undergone a further delay due to the JR and DIP budget is now being renegotiated. However, it is anticipated to be in the region of [REDACTED] which is [REDACTED] over the latest Operational Plan and [REDACTED] over the Capital Baseline for the scheme but remains [REDACTED] lower than the Most Likely assured cost estimate from May 2024.</p> <p>However, until the DIP budget negotiations have concluded Commercial have recommended that the scheme's request to NH IC is based on the most likely commercial estimate figure. Therefore, the current Project Manager's forecast is [REDACTED] in line with the latest commercial estimate most likely figures.</p>		
	Over 20m – contract with a 'grant' element administered by and through the procured supplier	<input type="checkbox"/>	This includes both feeds and grant funding channelled through the contract.
	If selected add a sentence on the status of the grant elements and commercial control approval.		
	Dispute disclosure over £20m i Discuss with the Commercial Resolution team.	<input type="checkbox"/>	Dispute disclosures submitted are independent of the commercial spend controls process (as above).
	If selected add sentence on status of disclosure with Cabinet Office.		
	Consultancy and professional services spend for contracts over £20m	<input type="checkbox"/>	i If you are uncertain of the category you require, please consult your finance business partner and procurement lead who can consult with the classification group
	If selected add a sentence on status of commercial control approval.		
Facilities management contract over £20m	<input type="checkbox"/>	i To be discussed with both FM and commercial CO leads, indicating the case is FM specific, for the Cabinet Office approvals routes to be sought.	
If selected add a sentence on status of commercial control approval.			
Digital and technology i	All digital and technology spend, regardless of value Discuss with Digital Governance.	<input type="checkbox"/>	
All existing and planned digital spend are approved through our digital and technology pipeline process, as part of joint assurance reviews (JAR). If selected add a sentence on status of the JAR approval.			

External recruitment: contingent labour i Discuss with HR business partners. CEO approval obtained via the Reward and Resourcing Executive (RRE) process. Cabinet Office external approval is all completed by HR following RRE.	Approval of all contracts with day rates of £1000 (including any fees)	<input type="checkbox"/>
If selected add a sentence on the status of approval.		

National property control i Discuss with FBS Business cases	Expenditure over £100,000 for the duration of the commitment (freehold acquisition cost or total rental expenditure to lease expiry).	<input type="checkbox"/>
When required add sentence on status of approval.		

Facilities management i FBS Estates and facilities only. i Where contracts are over £20m the CO commercial spend control process is to be followed.	Submit a FM contract pipeline for all FM contracts, expiring in the next 3 years.	<input type="checkbox"/>
	Approval for all new facilities management contracts and all contract extensions above £500k and under £20m.	<input type="checkbox"/>
	Approval for contract variations above £10m	<input type="checkbox"/>
When required add sentence on status of approval.		

Redundancy and compensation i Discuss with HR Business Partner.	Approval of all redundancy and compensation schemes and certain individual exit arrangements.	<input type="checkbox"/>
When required add sentence.		

Learning and development i Discuss with Organisational Development Learning and Development Lead.	Learning and development (Civil Service Learning) spend controls	<input type="checkbox"/>
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When required add sentence.

1.8.2 HM Treasury

Novel/contentious i Discuss with Company Secretariat, General Counsel Division and Financial Governance	<input type="checkbox"/>
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When required add detail.

Advance payments i Discuss with Finance Business Partner.	<input checked="" type="checkbox"/>
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Statutory undertakers advanced payments

HMT approval has been granted for advance payments to Anglian Water and National Gas for SU Diversions, both >£3m.
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Special payment - Discuss with Finance Business Partner	<input type="checkbox"/>
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When required add brief detail and anticipated timing of submitting to HMT (via FBS).

2. Strategic case

2.1. Relevant strategies

The scheme's specific Transport Objectives, as agreed in the Client Scheme Requirements, are as follows:

Economy

- To reduce congestion and increase reliability of journey times on the strategic corridor.
- Assist in bringing forward development and regeneration opportunities in the surrounding area and immediately adjacent to the scheme.
- To minimise traffic disruption due to construction works and incidents.
- To achieve optimum whole life costs taking into account future maintenance and operation, and disruption to users.

Environment

- To minimise impacts on both the natural and built environment, including designated landscape/biodiversity features.
- To seek to mitigate impacts on air quality and noise.
- To ensure effective measures are in place to protect watercourses from pollutant spillage on the highway.
- To investigate and encourage the use of environmentally friendly operations and products throughout the project life cycle.

Society

- To improve the safety for all road users.
- To manage the safety for road works in accordance with the requirements of GD04/12 – Standard for the Safety Risk Assessment on the Strategic Road Network and the Health & Safety at Work act 1974 to be So Far As Is Reasonably Practicable (SFARP).
- To improve safety for residents in the vicinity of the junction.
- To facilitate integration with other transport modes where applicable.

- To ensure a consistent high standard of signing relating to the junction and scheme.
- To seek to reduce severance by maintaining or providing appropriate facilities for crossing and travelling along the route for non-motorised users.

Public Accounts

- To be affordable and represent High Value for Money according to DfT appraisal criteria.

Scheme Specific Objectives

- Improve flow of traffic through junction and along A47 corridor.
- Facilitate regional development and growth in the Norfolk area and increase capacity of the strategic road network to absorb growth.
- Reduce journey time delays through the specific route.
- Improve journey time reliability through the specific route.
- Decrease risk of accidents and collisions.

The scheme's objectives link to the NH's Performance Specification and consideration has been made in the table in Appendix 1 to the contribution to each KPI the scheme will make.

'Strategic Fit' with Policy	
Policy	Key Extracts
National Policy	
DfT Transport Investment Strategy	<i>"Reducing congestion and strengthening connectivity are both crucial for increasing local productivity and creating places in which people want to live and work"</i>
Road Investment Strategy (March 2015)	<i>"Our ambition for the next 25 years is to revolutionise our roads and create a modern SRN that supports a modern Britain, making a real difference to people's lives and businesses' prospects."</i>
National Highways Goals for the Strategic Road Network	<i>"Improving the reliability of journey times...Reducing deaths and injuries in line with Government targets."</i>
Strategic Framework for Road Safety (March 2011)	<i>"There have been impressive improvements over previous decades and in recent years. We are committed to ensuring this trend is maintained."</i>

The scheme has been announced and funded in line with the Road Investment Strategy (RIS) for Road Period 1 (RP1). On 11 March 2020, the Government published its second Road Investment Strategy for the period 2020-2025 (RIS2). Part 3: The Investment Plan sets out the Government's expenditure priorities which confirms the ongoing commitment to the scheme. The scheme had an NH delivery plan commitment to start works by 31 March 2022.

A formal change control was submitted due to the JR delay to amend the SoW and OfT dates. It has been approved by DfT and the SoW date now appears in Q4 of FY24/25, with the OfT date appearing in Q1 FY27/28.

The RIS sets out a brief for NH to manage the delivery of £15 billion of investment in the road network, which includes £11 billion of capital investment between 2015 and 2020 which will deliver £1.2 billion of efficiency savings. The RIS identifies a number of key challenges on the Strategic Road Network (SRN), including increasing demand, delays and associated environmental impacts as well as the need to provide customers with reliable journey information. The RIS defines the works required for this project as "dualling of the A47 between the A1 and the dual carriageway section west of Peterborough."

In 2020, the scheme was reconfirmed for RIS 2, with the same requirements to be delivered between 2020 and 2025.

Maximising the economic impact of the SRN is particularly important. Improvements to capacity and connectivity between key cities will help to lever in investment and will better enable local people to access employment opportunities. 'The Road to Growth', National Highways' first strategic economic growth plan, evidences the relationship between the SRN and the economy and sets out how it will increase its economic contribution.

In addition, the scheme is required to support the A47 Strategic route and aspirations for local housing and employment developments, which will allow for local economic growth.

The proposed changes to the route between North Tuddenham and Easton will provide a better flow for traffic and increase capacity on the route which will enable business traffic to reach destinations quicker and safer. The route will provide safer access to and from adjoining routes as well. This aligns with the A47 Alliance aspirations, which brings together the business community, local authorities, MPs and stakeholders along the whole of the trunk road route between Peterborough and Lowestoft.

The A47 North Tuddenham to Easton Improvement scheme can be seen to support a number of other local and or national strategies and plans, like The Greater Norwich Joint Core Strategy (JCS) and the Greater Norwich Infrastructure Plan (GNIP), which supports the delivery of the JCS. The JCS identifies locations for new housing, employment growth, changes to the transport infrastructure and other developments. More details are provided in External Drivers below.

2.2 As-is position

2.2.1 History and issues with existing arrangements

The section of the A47 between North Tuddenham and Easton experiences peak period congestion. Growth in Peterborough and Norwich will exacerbate this condition as more traffic aims to flow along the A47 corridor. Considerable investment in business and housing near to the A47 will increase pressure as well. In addition, this section of the A47 has a poor safety record while the A47 as a whole is recognised as having one of the worst safety records for an A road in the UK. The North Tuddenham to Easton route is poor and has a number of adjoining routes that are in a poor state of repair and are accident black spots. During the period July 2015 to June 2019, a total of 3 fatal accidents, 16 serious accidents and 78 accidents were record along the section of the A47.

The A47 North Tuddenham to Easton (eastbound) has an average speed significantly lower than the daily average during the AM peak. This is an indicator of congestion and affects journey reliability on the link.

Due to the lack of nearby alternative routes, the route resilience on this link is an issue.

The key problem is defined in the Feasibility Study for North Tuddenham to Easton as follows: "It is predicted that the link stress on this link is currently an issue. In both peaks by 2021 there will be a link stress of over a 100% in both peaks". Demand is expected to exceed capacity without dualling the link.

Increased congestion in future years is likely to constrain economic growth in Norwich and South Norfolk and reduce user satisfaction.

2.2.2 Business need and service gaps

Three key problems have been identified along the North Tuddenham to Easton route. Each of the problems is expected to deteriorate further in the future as traffic growth exacerbates the current transport problems. The problems are briefly described in the following sections.

Problem 1: Congestion and delay on the A47 North Tuddenham to Easton route disrupts journeys on the strategic road network and local roads.

At present, motorists experience congestion and delays along the A47 North Tuddenham to Easton route as this section of the A47 is single carriageway. As a result, it proves very difficult to overtake slower moving vehicles. In addition, when an accident or incident occurs the route becomes blocked causing congestion and rat running through neighbouring villages. Key junctions along the A47 mainline have been modelled and show the scale of the delays in the base year and include Wood Lane, Taverham Road Southbound approach, and Blind Lane Northbound approaching the A47. In the AM and PM peak periods average delays of 28 to 24 seconds at Wood Lane, 119 to 120 seconds at Taverham Road and 93 to 83 seconds of delay at Blind Lane. The introduction of the scheme will reduce these delays considerably and further modelling results are detailed within the Stage 5 ComMA report.

Problem 2: Resilience to incidents or accidents is poor, resulting in significant disruption and unreliable journey times

With high demand for using A47 North Tuddenham to Easton route and the increasing levels of traffic predicted for the future, the ability of the route to be resilient to unplanned events will remain poor (for example, crashes, breakdowns, weather events and road maintenance/road works). As traffic volumes increase, capacity of the route will remain above 100% for longer and in peak conditions there would be a significant increase in travel times. In addition, the risk and rate of accidents and injuries also contributes to the resilience issues and the resulting increase in journey times. During the period July 2015 to June 2019, a total of 3 fatal accidents, 16 serious accidents and 78 accidents were recorded along the section of the A47.

Problem 3: Actual and significant perceived safety concerns associated with driver movements along the route, particularly at adjoining roads.

The intersections are all T junctions adjoining the A47. In addition, attempting to head north to south across the A47 proves difficult and unsafe with the speed of vehicles in both directions. With the use of local knowledge this is a pattern often used for movements including school trips and hospital or doctor appointments, as well as emergency services movements. In particular there is a large volume of slow-moving lorries joining the A47 at the Wood Lane as it is a known designated HGV route.

Summary

An overview of each of the problems, their timescales and key drivers to addressing them is shown in Table 2 below. This summary highlights the alignment of the problems with the key policy drivers identified with National Highways and key stakeholders.

Table 2: Summary of problems and causes

Problem & Causes	Timescale	Key Policy Drivers
Congestion and delay on the A47 North Tuddenham to Easton route disrupts journeys on the strategic road network and local roads Key causes: <ul style="list-style-type: none"> • Growing traffic demands to use A47 • A lower than average speed limit along the route • Local growth and development in Honingham (The Food Hub in particular) • Deficiencies in the design of the route to cater for current demand and movements, including the local connections 	Current and future	<ul style="list-style-type: none"> • Unlocking economic growth and new housing delivery – particularly along A47 corridor and local growth around North Tuddenham, Hockering, Honingham and Easton. • Addressing poor customer experience and high level of complaints • The A47 is critical link to the strategic growth and development set out in the Economic Plan for Norfolk

<p>Resilience to incidents or accidents is poor, resulting in significant disruption and unreliable journey times</p> <p>Key causes:</p> <ul style="list-style-type: none"> • High number of accidents and incidents occur along the A47 North Tuddenham to Easton route due to poor lane marking, signage, visibility, driver behaviour and unsafe access from adjoining side roads. • Access points to the route are T Junctions with no slip roads giving any time for traffic to reach suitable speeds • The route is operating at capacity, therefore inability to operate efficiently in the event of an accident or incident. • Depending on nature and location of incident the traffic levels may lead to issues on responding to the incident • The A47 is recognised as one of the worst performing A roads in the UK in relation to reported accidents 	Current and future	<ul style="list-style-type: none"> • Smoothing traffic flows generally and maximising network availability on the SRN • Supporting economic growth and competitiveness through greater reliability in journey times • Improving user satisfaction
<p>Actual and significant perceived safety concerns associated with driver movements along the route particularly at adjoining roads.</p> <ul style="list-style-type: none"> • High number of accidents and incidents occur on the roundabout due to poor lane marking, signage, visibility and driver behaviour. • Access points to the route are T Junctions with no slip roads giving no time for traffic to reach suitable speeds • Poor perception of safety due to confusion as road narrows from dual carriageway to single carriageway. 	Current	<ul style="list-style-type: none"> • Improving network safety issues and reducing the number of collisions along the route • Smoothing traffic flows generally and maximising network availability on the SRN • Improving user satisfaction • Maintaining safe access for pedestrians and cyclists through the route.

2.3 Business need

2.3.1 Key drivers

Internal drivers

The A47 between North Tuddenham and Easton is a very busy section of the A47 Corridor and often experiences severe congestion. The section of the A47 provides access to Norwich City Centre and also Great Yarmouth which is heavily utilised during the holiday periods plus it links the road to the Thickthorn Park and Ride. As such the carriageway plays a key role in connecting Norwich with Cambridge, London and other key destinations across the East of England.

In their Route Strategy for the A47 (April 2014), Highways Agency (now National Highways) set out the priorities for the first road period (2015/16 to 2019/20). It identifies North Tuddenham to Easton as a major A Road with capacity issues as it caters for high levels of demand toward the city centre with forecasts set to increase potential traffic volume along the route due to economic growth. The sections of the A47 in this area are also accident hotspots and the A47 is the trunk road with the second highest accident frequency nationally.

In December 2014, DfT published the Road Investment Strategy for 2015 to 2020 which sets out the list of schemes that are to be developed by National Highways. This was further confirmed with the Road Investment Strategy 2 for 2020 to 2025. Possible solutions for schemes named in the RIS have been identified through the Route Strategies (<https://www.gov.uk/government/publications/route-based-strategies-evidence-reports>) process run by National Highways. This collated evidence on network performance issues and engaged local stakeholders and interested parties on the problems, issues and potential range of solutions.

The capacity issues between North Tuddenham to Easton can be attributed to:

- high volumes of traffic on the A47 moving tidally, north into Norwich in the AM peak period and south in the PM period;
- several movements to and from Great Yarmouth
- large volumes of farm traffic in addition to a recognised HGV route causing traffic to and from church lane for HGV
- several movements to and from the Park & Ride
- single track traffic preventing the overtaking of slower moving vehicles

The National Highway's Strategic Business Plan sets out the following strategic outcomes:

1. Improving safety for all
2. Providing fast and reliable journeys
3. A well-maintained and resilient network
4. Delivering better environmental outcomes
5. Meeting the needs of all users
6. Achieving efficient delivery

To measure the success of these outcomes, the Strategic Plan also identifies a series of KPIs and associated targets. Many of these complement the outcomes which are set out within the RIS and these have been key in the identification, development and assessment of alternative options for improving the section between North Tuddenham and Easton.

The Strategic Plan also includes specific KPIs for delivering better environmental outcomes. This scheme has looked to address and/or contribute to achieving these KPIs and related outcomes wherever possible. Some of the key environmental indicators featured relate to:

- Noise – Road noise mitigation for 7,500 households in 'noise important areas', funded through designated funds.
- Air quality - Bring agreed sections of the SRN into compliance with legal NO₂ limit values as soon as possible.
- No net loss of biodiversity across all National Highways activities by the end of RP2
- Reduce carbon emissions resulting from National Highway's electricity consumption, fuel use and other day-to-day operational activities during RP2.

External drivers

The scheme is required to support the A47 Strategic route and aspirations for local housing and employment developments, which will allow for local economic growth. Housing employment and economic growth is leading to an increased demand on the road network in the North Tuddenham to Easton area. The scheme is needed to add capacity and support the flow of traffic through this single carriageway section which will support improvements to the local economy.

The A47 Alliance brings together the business community, local authorities, MPs and stakeholders along the whole of the trunk road route between Peterborough and Lowestoft. Partners, including the Greater Cambridge Greater Peterborough and New Anglia LEPs, are working together have been making the case for improvements and to secure the investment required to make the improvements. The proposed changes to the route between North Tuddenham and Easton will provide a better flow for traffic and increase capacity on the route which will enable business traffic to reach destinations quicker and safer. The route will provide safer access to and from adjoining routes as well.

The single carriageway section of the A47 between North Tuddenham and Easton lies between two dual carriageway sections of the A47 and acts as a bottleneck, resulting in congestion and leading to longer and unreliable journey times. This section of the A47 also experiences congestion, operating currently over capacity. The Eastbound has an average speed significantly lower than the daily average during the AM peak. This is an indicator of congestion and affects journey time reliability on the road.

This section of the A47 also has a poor safety record, the A47 being ranked 2nd nationally for fatalities on A roads and the accident severity ratio is above average. During the period of 2015 to 2019 a total of 3 fatal accidents, 16 serious and 78 slight accidents have been recorded along a 11km length of the existing A47 from North Tuddenham to Easton.

Due to the lack of nearby alternative routes, route resilience on this link is also an issue.

Dualling of this section of the A47 offers a solution to the congestion issue and will allow economic growth in the area and reduce the number of accidents.

In addition to providing a solution to the specific scheme objectives, the A47 North Tuddenham to Easton Improvement scheme can be seen to support a number of other local and or national strategies and plans. An example is The Greater Norwich Joint Core Strategy (JCS), adopted in March 2011 then amended in January 2014 and which covers the period from 2008 to 2026. It sets out long-term vision and objectives for the area, which includes strategic policies for steering and shaping development. The JCS also identifies locations for new housing, employment growth, changes to the transport infrastructure and other developments. Housing employment and economic growth is leading to an increased demand on the SRN and the scheme aims to add capacity and support the flow of traffic between North Tuddenham and Easton, in turn supporting improvements to the local economy.

The Greater Norwich Infrastructure Plan (GNIP) is a document that helps coordinate and manage the delivery of strategic infrastructure to support growth, high quality of life and an enhanced natural environment. It is a live document, updated annually to reflect the latest information. The GNIP supports the delivery of the JCS, other Local Plan documents for the area and various other strategies, deals and plans. It also focuses on the key infrastructure requirements that support the major growth locations.

Nationally there is a requirement for the DfT to invest in and maintain the SRN, whilst making the roads less congested and polluted, and maintaining a high safety standard. These themes are reiterated in regional and local policy objectives. Another key Theme is the requirement to support economic growth which is replicated in the JCS and GNIP detailed above.

2.3.2 Impact of not changing/doing nothing

The consequences of a do-nothing scenario would see the North Tuddenham to Easton section of the A47 deteriorate further thus creating a strain on the SRN and limiting the potential for economic growth. Traffic flow will increase naturally with growth in the surrounding areas.

Specifically, without intervention:

- The route will continue to operate above capacity during peak periods.
- Accidents and incidents will increase as traffic flow and demand along the route increases.
- Safety will continue to be of concern with a number of unsafe adjoining side roads.
- Journey times are set to increase in the coming years.

2.4 The programme/project/service

Scope

The RIS announced the Scheme as “dualling of the single carriageway section of the A47 between Norwich and Dereham, linking together two existing sections of dual carriageway”. The improvement is to link two existing stretches of dual carriageway to provide a longer continuous route of dual carriageway. Each option developed provides this solution through a variety of routes and side road junction designs.

The objectives of the scheme have been developed based on a study into future problems between North Tuddenham and Easton undertaken during PCF Stage 1. These objectives contribute to the performance objectives defined in the Strategic plan.

- Improve flow of traffic through junction and along A47 corridor.
- Facilitate regional development and growth in the Norfolk area and increase capacity of the strategic road network to absorb growth.
- Reduce journey time delays through the specific route.
- Improve journey time reliability through the specific route.
- Decrease risk of accidents and collisions.
- To reduce existing levels of delay and congestion. This aligns with the strategic aim of providing fast and reliable journeys. The section of carriageway should operate within capacity once all committed development is taken into account – from before and after analysis.
- To address current road safety issues. This aligns with the strategic aim of improving safety for all. Success will be measured using before and after analysis of the accident rates at the two current collision cluster sites with an anticipated reduction.
- To minimise the environmental impact on sensitive receptor(s). This aligns with the strategic aim of delivering better environmental outcomes. Success will be measured using before and after analysis at identified receptors for noise and air quality.

2.4.1 Proposed strategic benefits and key performance indicator (KPI) contributions

KPIs

The scheme aligns with the Key Performance Indicators set out in the Road Investment Strategy. These indicators, and outline proposals for how the scheme can meet them, are set out in the table in **Annex 7.1.1**.

In summary, a confidence rating was given showing how the scheme aligns with each of the KPIs, where:

- green represents strong confidence for alignment
- amber represents limited confidence for alignment
- red shows areas of concern

KPI	RIS2 target	Confidence rating
The number of killed or serious injuries (KSIs) on the strategic road network (SRN). Stage 4	<i>Ongoing reduction in the number of people killed or seriously injured on the SRN to support a decrease of at least 50% by the end of 2025 against the 2005-09 average baseline.</i>	
Average delay: Difference between the observed travel time and the speed limit travel time (seconds per vehicle per mile) Stage 4	<i>Ambition: Performance to be no worse at the end of RP2 than it is at the end of RP1. National Highways will be required to demonstrate how it has acted to reduce delays in support of this ambition.</i>	
Network availability: Percentage of the network free from traffic restrictions owing to roadworks. Stage 4	<i>Achieve 97.5% lane availability in 2020-21. Existing metric to be replaced by a new expanded metric with target based on baselining work undertaken during 2020-21.</i>	
Incident management: Percentage of incidents cleared within one hour, based on 24-hour coverage.	<i>86% of motorway incidents cleared within one hour.</i>	
Pavement Condition: The percentage of pavement asset that does not require further investigation for possible maintenance. Stage 5	<i>Achieve 95% of road surface that does not require further investigation for possible maintenance for years 1 and 2 of RP2, based on the continuation of the current pavement metric. (Metric will change from year 3 onwards)</i>	
Noise Stage 4	<i>7,500 households in Noise Important Areas mitigated using funding from the Environment and Wellbeing designated fund during RP2.</i>	
Biodiversity Stage 4	<i>Achieve No Net Loss of biodiversity over the whole National Highways soft estate by the end of RP2.</i>	
Air Quality Stage 3	<i>Bring links agreed with the Department and based on the Pollution Control Mapping model into compliance with legal NO2 limits in the shortest possible time.</i>	
National Highways Carbon Emissions Stage 5	<i>75% reduction at the end of RIS2, from a 2017-2018 baseline</i>	
Road User Satisfaction: measured using the Strategic Road User Survey (SRUS)	<i>Achieve an 82% road user satisfaction score in 2020-21 and 2021-22, with year on year increases in following years.</i>	
Roadworks information timeliness and accuracy	<i>Achieve 90% accuracy of roadworks information seven days in advance of works by 2024-25, with an increasing trajectory of improvement through RP2 from the level of performance achieved by the end of RP1.</i>	
Efficiency	<i>Realise and evidence the efficiency target of £2.304bn capital and operational expenditure.</i>	

Occupational health, safety and wellbeing:

Safety (GG 104 Requirements for safety risk assessment).

Road user safety.

Occupational health and wellbeing.

- All schemes, projects, programmes, operational activities, policies and other initiatives undertaken by National Highways (HN) have to be implemented within strict safety guidelines. The North Tuddenham to Easton route is one of the accident hotspots on the A47 Corridor

Improvement Scheme and the new route and upgrades to adjoining routes will help to alleviate these issues.

- The scheme proposes dualling of the carriageway to the north and south of the existing A47 alignment. There will be a number of points which the new dualled A47 will cross the existing A47. As a result, this will stop up parts of the existing road. The new dualled carriageway will improve the safety of this route and will provide additional capacity for traffic. Traffic will continue to bypass the villages of Hockering and Honingham and provisions will be made to ensure adjoining routes and junctions are upgraded. Plans also include potential provision for non-motorised users (NMU) to access both sides of the A47 route.
- Works across all road maintenance, renewals, improvements and upgrades must take into account the need to manage safety risk exposure, including that of the 'workers' (those who are either directly employed by National Highways or those in a contractual relationship), the 'users' including road users, the police and other emergency services and 'other parties'.
- Our initial air quality assessment shows that there will be no significant changes in air quality for the residential properties in the area. The scheme moves away from both Hockering and Honingham villages but moves closer to a few houses situated on Mattishall Lane. The majority of the residential areas are expected to experience improved air quality as a result of the scheme, due to improved traffic flows. Air quality will be monitored in the area with the aim of meeting national air quality objectives.
- Our initial noise assessment shows that there will be no significant changes in noise in the built-up areas near the junction. We will use low noise road surfacing and the detailed design will include further assessments to determine whether any additional noise mitigation, such as barriers are required. We will pay particular attention to the properties nearest to the proposed junction.
- We will provide appropriate drainage to ensure the surface water from the road is drained efficiently. Existing watercourses and groundwater will be protected with balancing ponds, pollution control devices and water treatment features.
- Safety during construction, both to the workforce and the road user, are of vital importance and are reflected in safety being both an imperative and a value for National Highways. A Construction Traffic Management Plan has been prepared which will be further refined as the scheme nears construction, this plan seeks to identify the most appropriate traffic management to enable safe construction of the scheme. During the selection process for the Delivery Integration Partner their proposed Health and Safety systems have been reviewed and their plans will be further analysed prior to construction. The support functions in National Highways will be fully utilised to ensure the plans for construction are safe helping to support National Highways "Home, Safe and Well" agenda.
- During the period July 2015 to June 2019, a total of 3 fatal accidents, 16 serious accidents and 78 accidents were recorded along the section of the A47. Dualling of the route will help improve many of the safety concerns along the route.

Equality impact

An Equality Impact Assessment (EqIA) has been produced to evidence the project's compliance with the Equality Act 2010 commensurate with its current level of development. The EqIA was further updated, approved and submitted within the documents for the DCO submission. The DCO was subsequently granted and no adverse Equality, Diversity and Inclusion comments were

made. The high-pressure gas main diversion is adjacent to a school for children with special needs. The diversion proposal has been developed to mitigate the impact on the nearby receptors.

The full Stage 5 Equality Impact Assessment (EqIA) Screening, Analysis and Monitoring documents can be accessed below
EqIA Report

Environmental Impact

Environmental surveys have been completed and the Environmental Assessment Report has been produced. A Record of Determination required the scheme needs to undertake a statutory Environmental Impact Assessment and produce an Environmental Statement – both of which were produced in Stage 3.

Following SES environmental specialist advice, quantitative analysis of environmental impacts was completed before the end of Stage 3 and refined in Stage 5. The qualitative assessments that have been carried out indicate that noise, air quality, historic environment and biodiversity impacts are likely to be moderate adverse, whereas landscape and water environment impacts slightly adverse.

The new route and planned junctions and lane adaptations between North Tuddenham and Easton will significantly change the strategic and local road networks. These will be affected by changes in traffic volume, speeds, and traffic flows. As a result, residential properties will see changes in noise and air quality as the new scheme moves either closer to or further away from the existing alignment. Where necessary mitigations are incorporated in the scheme design.

Appropriate drainage is provided as part of the scheme design plans to ensure the surface water from the road does not adversely affect the area. Existing watercourses and groundwater will be protected with balancing ponds, pollution control devices and water treatment features.

Whole Life Carbon Impact Carbon

In line with National Policy and the Design Manual for Roads and Bridges (LA114: Climate), the carbon metrics provide evidence of the carbon impacts of the investment and an assessment of these impacts for carbon budget periods.

While the template suggests a Carbon Reduction Opportunities Table this has since been superseded by the new product, the Carbon Management Report Stage 5

Overall Carbon Impact		CB4	CB5	CB6	60 yr Total
		2023-27	2028-32	2033-37	
Change in emissions (tCO2e)		59,772.30	34,981.88	38,149.20	591,209.64
Net Non-carbon Benefits per tCO2e (£2010 PV)		£230.71			
Disbenefit of Average Tonne of Carbon* (£2010 PV)		£76.23			
Disbenefit of Average Tonne of Carbon, adjusted to Market Prices* (£2010 PV)		£30.79			
Change in tCO2e per £1m construction spend		#DIV/0!			
Valuation of Change in all emissions* (£2010 PV)		£45,069,290.27			
Valuation of Change in all emissions, adjusted to Market Prices* (£2010 PV)		£53,677,863.25			

*user BEIS appraisal value or captured in the Chief Analyst Carbon Valuation Tool and, for traded emissions, estimated UKETS permit prices

Corporate Activity		2021	2022	2023	2024	2025	RP2 Total	RP3 Total
Change in emissions (tCO2e)		-	-	-	-	-	-	25.10
		Total						
Cost Effectiveness of Corporate Carbon Reductions £/(tCO2e)								
Valuation of Change in Corporate Emissions* (£2010 PV)		£22,503.48						
Valuation of Change in Corporate Emissions, adjusted to Market Prices* (£2010 PV)		£29,579.72						

*user BEIS appraisal value or captured in the Chief Analyst Carbon Valuation Tool and, for traded emissions, estimated UKETS permit prices

Construction & Maintenance Activity		CB4	CB5	CB6	60 yr Total
		2023-27	2028-32	2033-37	
Change in emissions (tCO2e)		53,156.00	-	-	53,156.00
Of which construction (tCO2e)		42,940.00	-	-	42,940.00
Of which maintenance (tCO2e)		10,216.00	-	-	10,216.00
		Total			
Cost Effectiveness of Carbon Reductions £/(tCO2e)					
Valuation of Change in Construction & Maintenance Emissions* (£2010 PV)		£6,626,736.03			
Valuation of Change in Construction & Maintenance Emissions, adjusted to Market Prices* (£2010 PV)		£7,885,815.87			

*user BEIS appraisal value or captured in the Chief Analyst Carbon Valuation Tool and, for traded emissions, estimated UKETS permit prices

Tailpipe/Road User		CB4	CB5	CB6	60 yr Total
		2023-27	2028-32	2033-37	
1) Emissions based on Core Assumption					
Change in emissions in carbon budget (tCO2e)		6,607.33	34,940.04	38,107.37	537,551.64
		Total			
Valuation of Change in Construction Emissions* (£2010 PV)		£38,420,050.77			
Valuation of Change in Construction Emissions, adjusted to Market Prices* (£2010 PV)		£45,762,467.65			
2) Emissions based on Transport Decarbonisation Plan (TDP)					
Change in emissions in carbon budget (tCO2e) - upper bound		6,488.26	31,378.00	26,287.70	124,634.03
Change in emissions in carbon budget (tCO2e) - lower bound		5,579.16	22,079.52	13,743.28	60,121.61

*user BEIS appraisal value or captured in the Chief Analyst Carbon Valuation Tool and, for traded emissions, estimated UKETS permit prices

Opportunity							
Xactium Risk No	Risk Title	Event	Current Score	Current Rating	Mitigation Action	Post-Mitigation Score	Post-Mitigation Rating
R39346	OPPORTUNITY: Early Procurement	There may be an opportunity for secure material prices.	3			3	
R46099	OPPORTUNITY: Materials to Blofield	There may be an opportunity to transfer suitable surplus class 1 & 2 material to Blofield	0			0	
R39333	OPPORTUNITY: A47 Programme Supply Chain Efficiencies	There may be an opportunity to leverage savings from the supply chain.	8		Looking to procure joint subcontracts for Blofield and Tuddenham on the following packages (Landscaping, archaeology, earthworks, drainage, laboratory, safety barrier, parapets and signs) Gaining better supply chain discounts, through good negotiation	10	
R45389	OPPORTUNITY: Shared CCTV Control Room	There may be an opportunity for A47 schemes to share a single CCTV control room, or remove the requirement for a control room on site and use remote monitoring (preferred option for this scheme).	8		Look at location options for shared camera room to ensure availability for the duration of all schemes. Explore the option for remote CCTV monitoring that has been presented by the supply chain partner to check it would meet our quality and service requirements.	10	
R46093	Carbon Op: Re-use of Scheme Haul Road and Platform Materials.	There may be an opportunity to re-use materials from haul roads and platforms elsewhere on the scheme.	6			6	

The Stage 5 Carbon Management Report provides further details.

Carbon Reduction Opportunities

Opportunities Realised	Future Opportunities
Stabilised Capping Layer: reduced road haul of taking class2 material away and importing of capping material (within efficiencies register)	Oasis Cabins: opportunity to use solar powered Oasis welfare units/cabins on site.
Use of Precast Elements – where possible pre-cast options have been used instead of in-situ construction (box culverts/bridge beams/headwalls)	Procure Materials with A Certified Low Energy Manufacturing Process: Reduction in carbon emissions - could require longer distance transportation
Reduced Pavement Width – Pavement widths have been adjusted to reduce amount of asphalt needed to be placed	Re-use of Scheme Haul Road and Platform Materials: re-use materials from haul roads and platforms elsewhere on the scheme
Reduced Pavement Specification – side roads have reduced to Norfolk County Council specification reducing pavement construction thickness	Use of Road Plannings for Farmer's Track: Savings on quantities of type 1 material
	Part Time WFH For Back Office: Reduction in car usage: Core/admin staff - 95% Construction/delivery team - 5%
	Mandate Electric or Hybrid Cars: Cost Neutral company policy to use hybrid or electric company cars wherever possible
	Mobile Food Delivery: reduce journeys from site and back for lunch
	Site Won Materials to Reduce Transport Carbon: Reduction in carbon transport, Cost savings in ToTP
	Purchase local materials: Purchase of local materials where possible (limited to items like kerbs or aggregates, to reduce material transportation
	Site Water to Be Reused: Ponds for water collection, opportunity to reuse rainwater for some construction activities (dust suppression)
	Alternative Fuel/Hydrogenated Vegetable Oil to Power Heavy Plant: opportunity to trial alternative fuel/use hydrogenated vegetable oil to power heavy plant on site reducing carbon emissions.
	Energy Saving Offices/compound: Solar/bio-diesel hybrid powered offices. Smart heating (switches off if

	windows left open). Smart sockets (switch off when equipment left on standby). Motion sensor light switches. Instant heat taps instead of water boilers or kettles. Use of low energy products for site offices - e.g. printers. Install smart metres.
	Use of Easy Base Manhole System – precast manholes with pipework already installed will reduce time and use of primary materials
	Transport unwanted material from Tuddenham to Blofield – Blofield have a deficit of class2 material and Tuddenham has a surplus. Plan is to send the surplus class2 to Blofield reducing material going to tip and import of primary materials

Nature

In line with the Design Manual for Roads and Bridges (LA104: Environmental assessment and monitoring and LD118 Biodiversity design), proposals shall evidence the mitigation hierarchy has been used to address impacts on biodiversity resources i.e., avoid, reduce, mitigate and compensate.

See table of Nature opportunities that demonstrate the mitigation hierarchy below:

Nature Opportunities

Opportunities Realised	Future Opportunities
During land take clarification we have reduced the amount of land we need to take in both temporary and permanent cases. This has reduced tree clearance needed throughout the scheme	Further reduction on tree removal during site clearance works
Creation of new water vole and badger habitats to reduce impact on local wildlife by installing new environments locally to prevent relocation	Installation of new bat fencing attached to the bridge to replace existing tree line at river Tudd bridge. 4m high trees will be planted leading to the bridge with a mesh fence bolted to the side of the bridge to continue the corridor
Design of wetland areas within the landscaping to encourage biodiversity throughout the site	Installation of new newt habitat at several locations along the route and to the side in the shape of ponds and reprofiling of ditches
	Installation of new bat and bird boxes along the route to mitigate trees that are being removed
	Use of stockpiles of materials to reduce number of HGVs on the roads at peak times

Communities

In line with the Design Manual for Roads and Bridges (LA104: Environmental assessment and monitoring, LA105 Air Quality, LA111 Noise and Vibration, LA113 Road Drainage and Water Environment and LD 119 Roadside environmental mitigation and enhancement), proposals shall evidence the mitigation hierarchy has been used to address impacts on air quality, noise and water resources i.e. avoid, reduce, mitigate and compensate.

See table of Community opportunities that demonstrate the mitigation hierarchy below:

Community Opportunities

Opportunities Realised	Future Opportunities
Low light emitting zones have been design for all grade separated junctions to reduce light pollution in a rural area	Volunteering days with East Anglian Air Ambulance to help the charity and communities of the east are being planned
NH funding has been used by Western Longville Parish council to install a new kitchen in their local village hall	
Use of East Anglian Air Ambulance meeting space for larger meetings promoting to other businesses and helping the charity at the same time.	

2.4.2 Environmental impact

Whole life carbon impact (Completing Carbon Metrics for IDC Papers)

- a. In line with National Policy and the Design Manual for Roads and Bridges (LA114: Climate), the carbon metrics provide evidence of the carbon impacts of the investment and an assessment of these impacts for carbon budget periods.
- b. At PCF Stage 3, emissions associated with construction reported within the Environmental Statement were estimated to be 94,105 tCO₂e¹. This assessment included plant fuel emissions for certain items only. The Climate Chapter of the Environmental Statement (ES) delivered as part of the Development Consent Order examination process stated that the Stage 5 embodied carbon assessment will include an estimate of plant emissions for all construction activities.
- c. At PCF Stage 5 (Detailed Design), the emissions associated with construction are estimated to be 42,940 tCO₂e. This figure has been used for Stage 3 when comparing to the Stage 5 assessment.

Design Amendments to Reduce Carbon

- a. In accordance with the DMRB LA 114 Climate guidance document, the Applicant sought to minimise carbon emissions as far as possible to contribute to the UK's net reduction in carbon emissions. This approach also supports the requirements of NPS NN paragraphs 4.38 to 4.46 (climate change adaptation) and 5.17 – 5.19 (carbon emissions).
- b. A hierarchical approach to carbon management has been applied, which applies the principles of build nothing, build less, build clever, build efficiently (as described in PAS 2080: Carbon Management in Infrastructure).

- c. The feasibility of carbon reduction opportunities has been appraised and during the Carbon Reduction Opportunities workshop and all potential challenges in their implementation in the design or at construction is recorded in the Project Carbon Management Log. Full details are available in the Carbon Management Report via HE551489-PCFP-GAL-0292
- d. Investigation will be carried out through Stage 6 on opportunities to reduce carbon emissions further. Examples will include the use of efficient plant types (e.g., the use of Hydrogenated Vegetable Oil (HVO) or electric plant) at future stages and could potentially allow savings in carbon emissions from construction. Similarly, the Scheme will look to include the use of on-site renewables or Renewable Energy Guarantees of Origin (REGO) certificates could be explored.
- e. Further steps that will be taken through Stage 6 to reduce carbon during the construction phase will include:
 - a. Carbon training and workshops with the team to identify further opportunities, which will be incorporated into the carbon opportunities register.
 - b. Lifecycle review of temporary works materials (e.g., haul roads, pile mats, etc) will be undertaken.
 - c. Low carbon compounds
 - d. Minimising logistics

Performance Against Carbon Reduction Targets

No carbon reduction target was set for the scheme at PCF Stage 3, but a substantial saving has been made overall (across modules A1 to A5) between PFC Stage 3 (Preliminary Design, updated carbon assessment) and PCF Stage 5 (Detailed Design) as shown in the following Table:

		Carbon baseline (tCO ₂ e)	Project Performance (tCO ₂ e)	Comparison to baseline (%)	Carbon reduction target (%)	Target carbon budget (tCO ₂ e)
Construction Carbon	A1-3 Construction materials	59,688	27,517	-54%		
	A4 Construction transport	24,925	6,135	-75%		
	A5 Construction plant (incl. land use and waste disposal)	9,492	9,288	-2%		
	Total	94,105	42,940	-54%		

2.4.3 Key stakeholders and customer requirements

Initial engagement with key stakeholders that could influence or have a strong interest in the scheme was undertaken during PCF Stage 1 and non-statutory consultation was carried out during Stage 2 in spring of 2017. The aim of this initial engagement was to introduce the scheme

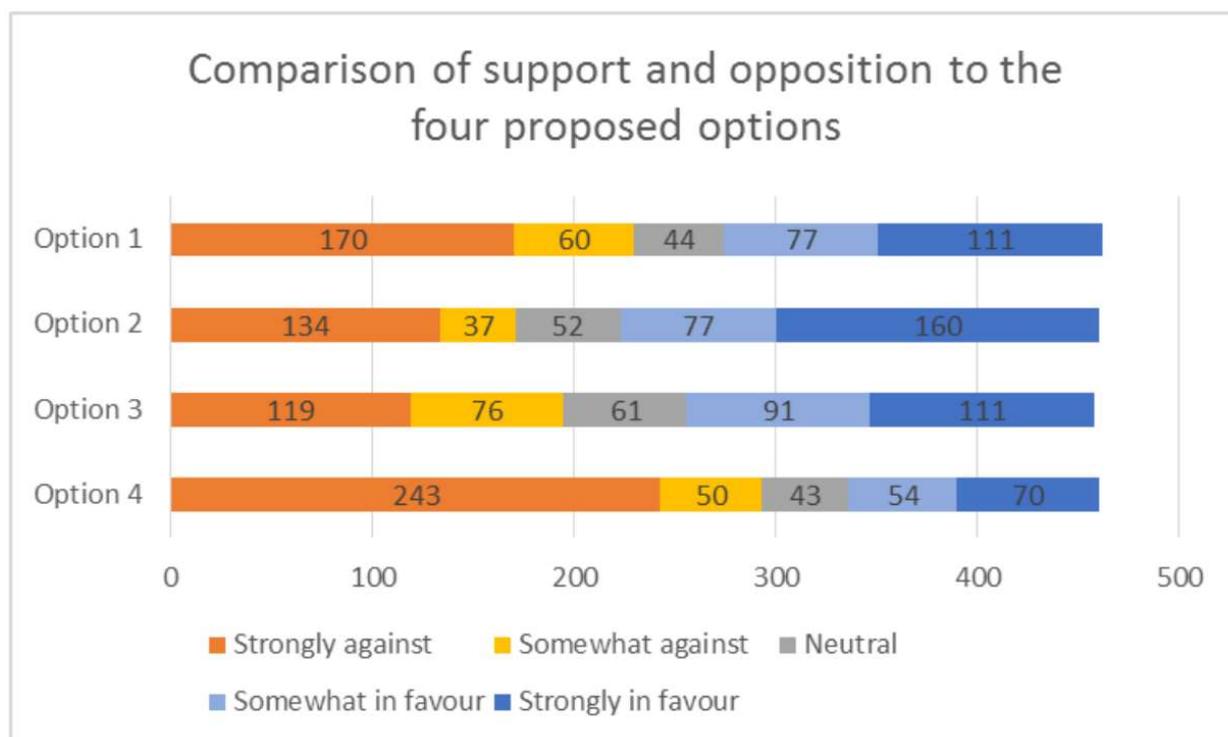
and obtain the views of key stakeholders and local residents on the key issues and the emerging concepts. The key stakeholders engaged during Stage 1 included:

- Norfolk County Council;
- South Norfolk District Council;
- Norwich City Council; and
- The A47 Alliance Group

There is strong support for the scheme by all the interested parties. The stakeholders recognise that current issues being experienced between North Tuddenham and Easton in terms of congestion and journey time reliability exist and that without intervention will deteriorate considerably in the future as traffic volumes increase. The concept of increasing capacity by providing a dual carriageway to link existing dual carriageway was accepted as a good way to address this part of the RIS1 road plan. However, the need for appropriate consideration and mitigation of environmental impacts associated with the proposed link options was also recognised.

Responses to the public consultation have been analysed and show that a majority of those consulted are in favour of the scheme. When asked about the need for improvement to the A47 North Tuddenham to Easton during the non-statutory consultation, 413 respondents agreed that improvements are needed while 46 disagreed. The question was again posed during the statutory consultation held during stage 3, (244) of the 339 who responded to this question said they agreed with the dualling proposals; (37) were neutral and (58) disagreed.

The level of support for each option during the non-statutory consultation can be seen in the table below.



Some concerns were raised in relation to the proximity of the scheme to St Andrews Church in Honingham and both major villages along the route (Hockering and Honingham) were both against a route located primarily to the north or south of the existing alignment.

The A47 Alliance group consider the changes extremely positive and are in favour of the upgrades. We will continue to liaise with them at their monthly forums to ensure stakeholder engagement is maximised.

Norfolk County Council (NCC) has an interest in the project and on-going liaison with NCC is maintained through regular meetings and forums where various schemes are discussed. The primary concern of NCC is the impact the scheme will have on the local residents during construction. Discussions over traffic management during construction are on-going in order to minimise delays during construction.

Statutory consultation for the scheme was held in February 2020 where customers were able to formally respond to the proposals as part of the statutory planning process. This was documented formally within publicly available consultation reports. Prior to the Consultation affected landowners, parish and district councils were consulted with as part of the design process. We continue with this consultation to date.

Further engagement has been carried out on the scheme, focusing on newly or differently affected landowners due to the progressed design. Meetings continue to be held with County, Parishes and District Councils, NWL Local Liaison Group and wind farms along with engagement with other stakeholders.

2.4.4 Options

Stage 2 and Preferred Route Announcement

Four options were considered for economic assessment at PCF Stage 2:

- Option 1 an offline dualling to the north of the existing (Now known as option 1)
- Option 3 an online dualling following the existing A47 route (Now known as option 2)
- Option 4 an offline dualling to the south of the existing A47 for the western part of the route and to the north of the existing for the eastern part of the route (Now known as option 3)
- Option 6 an offline dualling to the south of the existing A47 route (Now known as option 4)

Figure 2.1 - Option 1

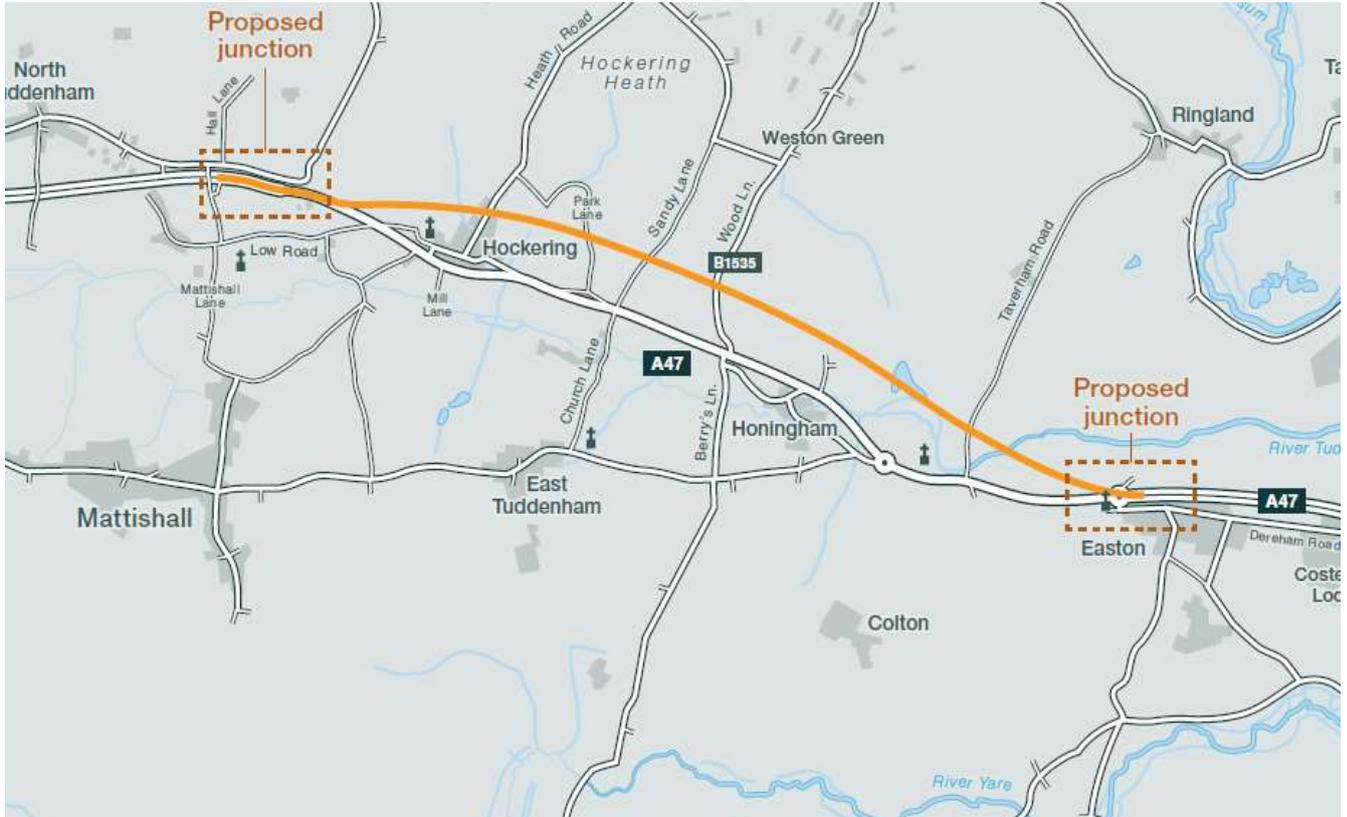


Figure 2.2 - Option 2

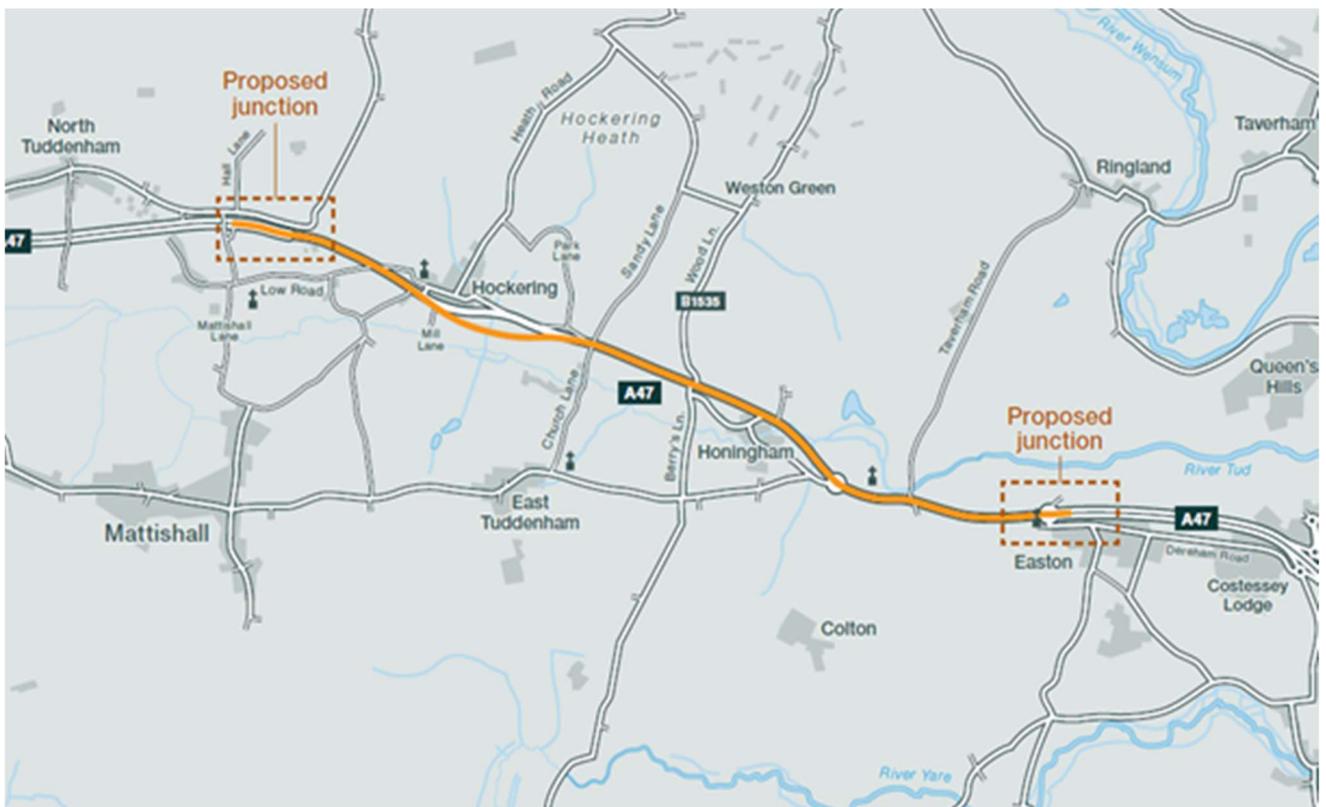


Figure 2.3 - Option 3



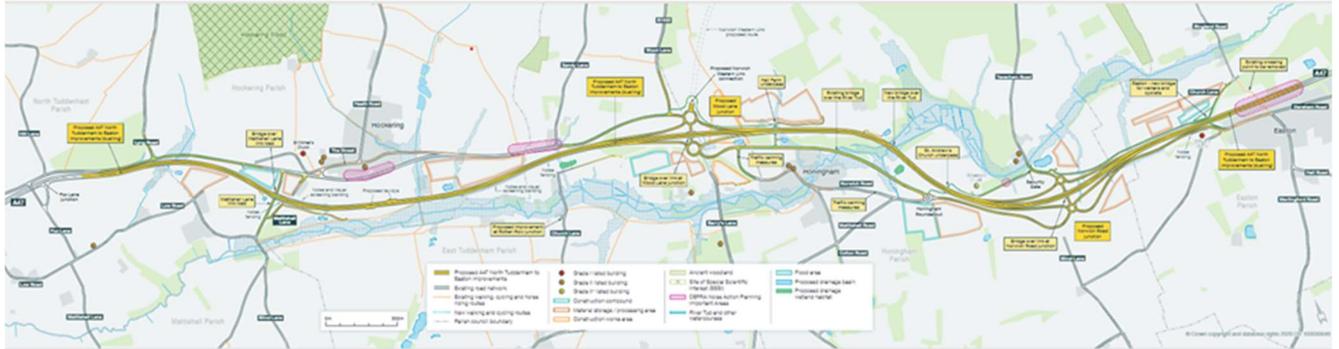
Figure 2.4 - Option 4



Through stage 2 further analysis and information was gathered in order to make the preferred route decision. The preferred route decision meeting was on 15 June 2017 and included representatives from Amey Stage 1 and 2 supplier Mott Macdonald Sweco Joint Venture Stage 3 and 4 supplier and the National Highways project team and technical specialists. The preferred

route was chosen for an option 2 variant taking into consideration the key elements favoured from both option 2 and 3 during consultation and also with a view of the environmental implications of each option.

Stage 3 Design development



The scheme released a Preferred Route Announcement (PRA) in Stage 2 (August 2017) with the intention to commence discussions with Statutory Undertakers and Statutory bodies during Stage 3. The scheme was then paused at the start of Stage 3 as part of the A47 Route optimisation change control until it recommenced under RDP in September 2019. When the scheme budget was set for RDP, there were a number of omissions from the scope. These centred around the assumed use of at grade roundabouts that was proven at the end of Stage 2 to be at capacity on the opening year and the lack of safe Public Rights of Way crossing points which require a diversion due to the severances as a consequence of the scheme and the increased focus of active travel through the DCO process. Following an as made DCO, the design was advanced to detailed design. The original Stage 2 design would not provide the benefits and the current scheme now addresses these shortfalls, through the latest design amendments as part of Stages 4 and 5. Although the cost increase has increased the present value of cost, it is offset by monetised benefits achieved as a result of the change from at grade to grade-separated junctions. This has improved the journey time benefits and consequently the VfM remains the same whilst the BCR has increased. It also provides a suitable proposal for the DCO submission whilst reducing the risk from stakeholder challenge which might have occurred if the Stage 2 design had been submitted.

The PCF Stage 5 Combined Modelling and Appraisal Report (ComMA) sets out the key assumptions and parameters involved in the economic assessment of the A47 North Tuddenham to Easton route.

Increased Junction requirements: The PRA detailed the main route alignment however it only had an indicative junction and side road strategy to accompany it.

The Stage 2 design included at grade roundabouts which were subsequently found during the development phase to be unviable due to the traffic flows thus rendering the junctions unsafe and at capacity immediately upon the opening year of the scheme. Furthermore, upon analysing the potential for compact grade separated junctions they too were immediately at capacity in the opening year as the DMRB guidance states that compact grade separated junctions should not be used on mainline flows above 30,000 AADT. This has created a requirement for grade separated junctions to be used which are now included in the design (2 dumbbell roundabouts set below the A47 main carriageway) supporting a free-flowing network and providing safe access and egress to and from the SRN for local communities. Based on the PCF Stage 5 modelling assessment, with the Norfolk County Council Norwich Western Link in place, in the opening year of 2025 the scheme is anticipated to have flows between 34,000 AADT and 40,000 AADT along this stretch of carriageway.

Following the increase in the scope of works to meet the project's high-level requirements and in response to the statutory consultation and stakeholder engagement there have been several reviews of the scheme to reduce costs. As a result, three key opportunities have been identified:

- a reduction in side road specification (widths and pavement thickness). This approach removed circa 30% of materials and construction identified.
- a reduction in Earthworks due to innovative methodology utilising U1 materials creating an improved earthworks balance reducing the material deficit by 100,000m³.
- a 30% reduction of drainage on side roads and a reduction in associated attenuation and drain water management.

The Norfolk County Council (NCC) Norwich Western Link (NWL) scheme is dependent upon the North Tuddenham to Easton scheme as it directly connects at one of junctions. During the time that the A47 scheme was paused, the NWL continued to work towards a PRA that was made in summer 2020. Therefore, the Stage 2 design had not incorporated the NWL as it was not a committed scheme. However, this is now included in the modelling.

WCHR requirements: In PCF Stage 3, three Public Rights of Way (PRoW) along the route have been identified which are either severed or adversely affected because of the scheme which creates a requirement for alternative provision by means of a diversion. The scheme has developed a Walking, Cycling Horse Riding (WCHR) strategy to accompany the A47 North Tuddenham to Easton improvements.

The current WCHR strategy has 3 additional structures along the route to address the severance comprising of underpasses and an over bridge. These structures support the connectivity of local villages, some of which are currently severed and an unsafe crossing point on an existing dual carriageway section. There is also an increased focus on DCO schemes on the provision and inclusion of passive transport (WCHR) within design proposals with an increased emphasis on not severing existing rights of way.

The current A47 has several single track and farm track accesses onto the carriageway. The scheme design severs a number of these and where practicable safely diverts these accesses into the new junction proposals. One of the accesses that was severed by the scheme was a local route that provided connection to schools and doctors surgeries for the village of Hockering. This was raised as a concern by the Parish Council during non-statutory consultation and was further investigated in PCF Stage 3. WCHR surveys and statutory consultation confirmed the use of the route and as such one additional underpass below the new proposed A47 has been included in the design in Stage 3 and further developed in Stages 4 and 5 as part of Detailed Design.

Environmental Mitigations: Engagement with the statutory bodies such as the Environmental Agency has highlighted mitigation requirements to reduce negative effects on the environment and the rural setting. This has resulted in additional scheme costs as a river crossing point has been enhanced and mitigation provided to reduce the impact on the environment. Furthermore, the initial Stage 2 design provided a bridge span was less than the current bridge in situ and so would not have been deliverable nor acceptable to the Environmental Agency.

The drainage design at PCF Stage 2 only had provision for "over the edge" drainage systems. The scheme is located near to the river Tudd and is known to have existing flood issues. To ensure the scheme design does not suffer from flooding, the drainage provision had to be increased to include attenuation ponds to catch water run-off.

As consequence of not having an Overseeing Organisation agent in place during Stage 2, the scheme did not include all the affected utilities. However, this has changed in Stage 3, when the DIP was appointed as OOA, and further work was done to identify all the necessary diversions. These include National Grid (High Pressure gas main), UKPN (132kv overhead power lines), BT, and Anglian Water. Through the engagement with the SUs during Stage 3 and the subsequent C3 submissions from the utility providers, the extent of SUs has been established. Currently, the

scheme has all C4s in place and the Statutory Undertakers PCF product was updated and signed off for the stage.

2.5 Risk and issues management | risks and opportunities

Risks are management in line with National Highways risk management processes. The project utilised Xactium to record and manage project risks, which are reviewed on a monthly basis.
Stage 5 Risk Management Plan
Stage 5 Risk Register

2.5.1 Constraints

The following constraints have been identified:

Environmental constraints

- Listed buildings – Grade I: Church of St Michael,
- Church of St Peter Grade II*: Church of St Andrew
- Grade II: Manor House, Manor Farmhouse, Icehouse, Church Farmhouse
- Noise Important Areas x 4
- Hockering Wood SSSI
- Habitats of potential ecological importance – Largely associated with the River Tudd
- Public Rights of Way
- River Tudd and associated floodplain including potential to realign the River Tudd
- Loss of agricultural land

Engineering constraints

- High Pressure Gas Main that crosses the scheme
- Alignment of existing A47 at western tie-in
- Rolling topography for vertical alignment, in particular, approach to junctions
- Public utility apparatus
- Existing rivers and watercourses
- Flood plain
- Bridge over River Tud (flood level, highway alignment, potentially restricting water flow)
- Ground conditions including ground water
- Drainage attenuation
- Buildability (tie-ins, crossing existing highway network)

There are five villages that the new scheme alignment will be in close proximity to: North Tuddenham, East Tuddenham, Hockering, Honingham and Easton. Other farm and commercial buildings, churches and community facilities are near to the A47 and properties are scattered throughout the rural area.

The capacity of the local road network close to the A47 provide a constraint to the project, urban routes are already significantly congested at peak times and are of poor quality. In addition, the new route alignment moves the A47 between two rows on houses on the Mattishall Lane.

Neighbouring development

National Highways are aware of the proposed link road to tie into the Northern Distributor Road (NDR). The project is behind North Tuddenham to Easton in terms of time scales however, the tie in will be along the A47. National Highways cannot inform our junction and side road strategy to suit the NDR link road as it is yet to be a committed development. However, As per DfT's TAG unit M4 forecasting and uncertainty, the schemes included in the modelling Core Scenario should have a likelihood of at least 'Near Certain' or 'More than Likely'. As the Preferred Route Announcement was made for Norwich Western Link (NWL) in July 2020, it was agreed with both National Highways and Norfolk County Council that the NWL should be classified as a "near certain" development and therefore was included within the scheme uncertainty log for both the

“Do Minimum” and “Do Something” core scenarios and so has been taken into consideration in regard to the traffic modelling and the junction design. The project teams have been working collaboratively throughout the preliminary design and are proposing to deliver through developer contribution a short connector arm linking the Norwich Western Link to the junction which will facilitate a suitable tie in thus negating the future requirement for traffic management on the junction to enable these works which may add further disruption to the customer after the A47 North Tuddenham to Easton scheme has been implemented.

In addition, the Food Enterprise Park is an ongoing development near the Easton end of the scheme. We have consulted with the developer of this new facility and ensured that our proposed junction arrangements take account of the anticipated traffic flows originating from this development.

Operation

Operational constraints during the construction and post-construction operational and maintenance regimes include:

- The need to maximise lane availability during periods of works, particularly during peak travel times where the tie ins/cross over the existing route are constructed.
- Limitations of suitable diversion routes for traffic affected by closures and restrictions during construction.
- Maintenance of provision for non-motorised users including footbridge alterations.

External constraints are related to the scheme being required to follow statutory Development Consent Order (DCO) processes for approval to construct the scheme and purchase the land required. The scheme is being developed to be compliant with the National Policy Statement for National Networks.

2.5.2 Key assumptions

Cost estimates have been produced in line with the standard processes of the NH Cost Estimation Manual and have been approved by NH Commercial Team. This means they cover the scope of works as known at the moment; risk and uncertainty (which includes items that may or may not be required within the scope); lands costs as forecast by the District Valuer; and the relevant adjustments for inflation. There is an assumption that these costs are as accurate as can be known at the moment. A separate estimate has also been produced to quantify the efficiencies that are likely to be achieved during the scheme.

All of these elements have been included within the scheme DIP BUDGET with an assumption that the estimates will remain within the DIP BUDGET following detailed design. There is a risk however that the scheme goes over the DIP BUDGET due to uncertainties around land costs, statutory undertaker diversions and risks as when they may be occurred.

The PCF Stage 5 Combined Modelling and Appraisal Report (ComMA) sets out the key assumptions and parameters involved in the economic assessment of the A47 North Tuddenham to Easton route.

2.5.3 Dependencies

The delivery of the project is dependent on:

- Funding being made available within the RIS as described within section 2.3.7
- Judicial Review Appeal court appeal determined in NH favour.
- Completion of all products to standard required to advance the project through the Stage gate assessment review process. Stages are being overlapped to ensure delivery on time

There are no dependencies on any other NH or external projects.

2.6 Recommendations

The conclusion is that the investment to deliver the scheme objectives and RIS commitment is robust and is therefore recommended.

From an economic, environmental, social and public accounts perspective, the preferred option fulfils National Highway's requirements for appraisal and demonstrates value for money in the use of taxpayers' money.

The scheme is also expected to generate Wider Economic Impacts (WEIs) valued at about £65.22 million. These impacts are positive in all cases, suggesting a favourable outcome on non-transport markets, contributing to increased productivity and government income.

Specifically, the scheme will enable:

- The route to stop operating above capacity during peak periods.
- Accidents and incidents to decrease as traffic flow and demand along the route increases.
- Safe journeys given the current number of unsafe adjoining side roads.

In addition, dualling the A47 would address the two main typical sources impacting journey time reliability:

- the A47 would be more resilient to incidents and the increased capacity would reduce the incidence of congestion causing a break down in flow.
- the effect of the presence of agricultural vehicles would be reduced by providing a second lane which other vehicles could use to overtake.

3. Economic case

3.1 Purpose

The value for money case summarises the costs and benefits of options to deliver the project's strategic objectives and recommends the preferred option for implementation. This section assesses the economic, environmental, social and public accounts impacts of the preferred option for the proposed scheme to fulfil National Highway's requirements for appraisal and demonstrating value for money in the use of taxpayers' money.

An economic assessment has been undertaken in accordance with the requirements of Transport Analysis Guidance. Overall, schemes are assessed against relevant government objectives which include:

- to provide good value for money in relation to impacts on public accounts;
- to improve transport economic efficiency for business users and transport providers;
- to improve transport economic efficiency for consumer users; and
- to improve reliability.

3.2 Options appraisal

One option, referred to as the Do Something (DS), was assessed in Stage 5.

For the Do Minimum scenario, as it has been agreed that for PCF Stage 5 each A47 RIS scheme in Norwich should be classified as "near certain", the Thickthorn and Blofield PCF Stage 5 schemes are included.

Also, in July 2019 the preferred route was announced for the NWL with the estimated start of construction in late 2022 and estimated opening year in 2025. It has been agreed that the NWL should also be classified as "near certain" given their PRA status, and therefore will be included in both DM and DS scenarios.

Do Something Scenario outlines the one option that has been modelled:

- 5.6 miles of new dual carriageway, running to the south of the existing A47 at Hockering and to the north of the existing A47 at Honingham
- Two new two-tier junctions where the A47 passes over the local roads at the intersections of Berry's Lane with Wood Lane (Wood Lane junction) and Blind Lane with Taverham Road (Norwich Road junction)
- Removal of the existing roundabout at Easton to create a free-flowing dual carriageway.
- Three bridges carrying the A47 over the River Tud and the proposed Wood Lane and Norwich Road junctions.
- Closing the existing Church Lane / Sandy Lane connection to the A47 with new side roads providing access to Wood Lane junction
- Retaining sections of the existing A47 for local road connections and new routes for walkers, cyclists, and horse riders where possible, with abandoned sections to be landscaped.

3.3 Key findings from the strategic and economic cases

The PCF Stage 5 ComMA documents the approach adopted for estimating the economic benefits arising from the scheme and summarizes the results of the assessments conducted as part of the PCF Stage 5.

The scheme's benefits are calculated from various sources, including:

- User benefits during normal operation (savings relating to travel times and VOC) assessed using TUBA.
- User disbenefits during construction were also assessed using TUBA (user disbenefits during maintenance assumed to be negligible).
- Accident savings forecasted using COBA-LT

Due to legal challenges arising from the Judicial Review process, the A47 North Tuddenham to Easton dualling scheme has incurred delays of almost two years, where the scheme is now expected to be Open for Traffic (OfT) in 2027 rather than originally planned OfT year of 2025.

It has therefore become necessary to undertake additional transport modelling and appraisal in response to the delays, whilst incorporating the notable updates to the Department for Transport's (DfT) Transport Analysis Guidance (TAG), Trip End Model version 8 (NTEM 8) and the revised National Road Traffic Projections 2022 (NRTP 2022). Further guidance released by National Highways Transport Planning Group (TPG), in relation to post-Covid adjustments has also been adopted to this latest update.

For that reason, it was agreed to undertake and produce a new round of modelling and appraisal outputs that will serve as an addendum to the existing Stage 5 ComMA report, originally issued to National Highways and approved in July 2023.

The following scenarios have been run as part of this analysis:

- NTEM 8 Core
- NTEM 8 Low growth
- NTEM 8 Mode balanced decarbonisation

- NTEM 8 Vehicle led decarbonisation

Monetized impacts related to greenhouse gas emissions, air quality, and noise, as well as benefits due to Journey Time Reliability (JTR) and (Wider Economic Impact) WEIs, have been estimated.

Full assessments of the social and distributional impacts resulting from the scheme have also been carried out.

The costs used in the assessment comprise the scheme construction costs provided by Galliford Try. Currently, there is limited information available to inform a maintenance cost appraisal. Reference was made to the July 2019 version of the COBA manual, which classifies maintenance costs as either non-traffic related (Group 1) or traffic related (Group 2).

An initial Benefit Cost Analysis (BCR) has been calculated over the 60-year appraisal period, excluding the outputs of the JTR assessment and WEIs, with an adjusted BCR also reported, including these impacts.

All benefits and costs were calculated in monetary terms and expressed as present values (PV) in discounted 2010 prices. This allows for a direct economic comparison with other schemes, even if they have different timescales.

The scheme is forecasted to generate user benefits of £209.41 million (PVB) over the 60-year appraisal period. The total scheme costs are £110.62 million (PVC), assuming none of the costs will be funded from developer contributions.

Taking into consideration the effects of construction delays, accident benefits, indirect taxation benefits, and monetized environmental impacts, the initial BCR is 1.24.

The scheme is also expected to generate Wider Economic Impacts (WEIs) valued at about £65.22 million. These impacts are positive in all cases, suggesting a favourable outcome on non-transport markets, contributing to increased productivity and government income.

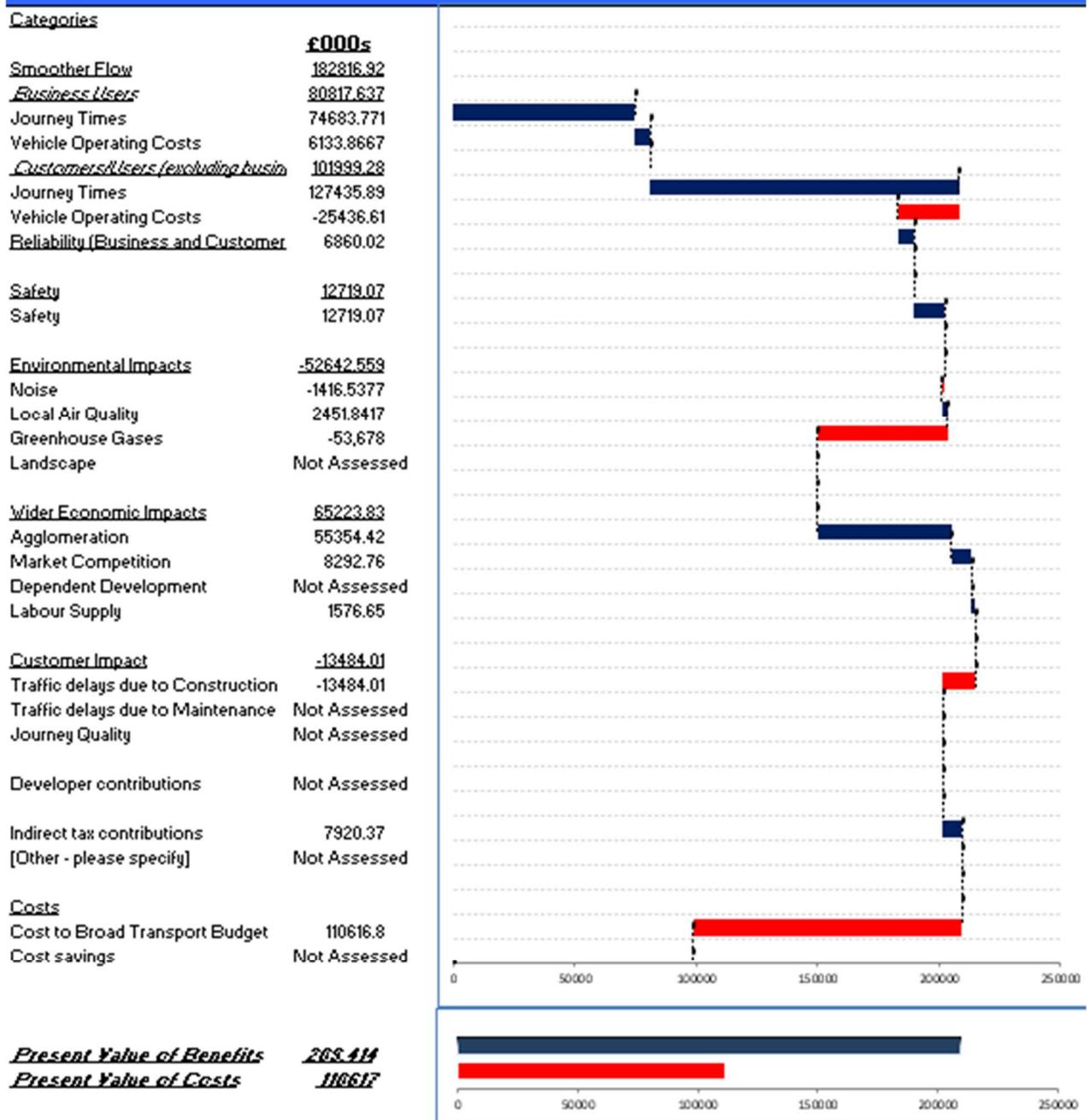
Including JTR benefits and WEIs, the adjusted BCR stands at 1.89.

The assessment of social impacts suggests that the scheme would have an adverse impact on socially vulnerable groups in terms of personal affordability. Additionally, the assessment of distributional impacts indicates that air quality, noise, and affordability would adversely affect vulnerable groups.

While the core scenario is considered the 'most likely' future scenario, forecasting into the future is inherently uncertain due to unforeseen changes in key assumptions. Therefore, the DfT recommends conducting scenario analysis to account for future uncertainty.

Waterfall diagram


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BENEFIT COST RATIO 1.89

VALUE FOR MONEY Medium

3.4 Long-list appraisal

Following the strategic shaping that concluded in Stage 0, the scheme progressed towards identifying a long list of potential solutions for the A47 during Stage 1. The long list of options was advanced to a point where enough information was presented to inform a sift against the objectives. In Stage 2, a sifting exercise was undertaken to assess the performance of four options against the strategic objectives of the scheme. The sifting process was undertaken by

scoring all the options against four independent parameters in two sections. It judged how the option would mitigate the known problems and support National Highway's objectives for the scheme. It judged the deliverability (factors political, planning, timescale and third-party constraints) and feasibility (physical constraint, land availability and design standards) of each option.

The results of the sifting exercise indicated that, primarily due to cost, land take and environmental impact, the 'free-flow' left Option 2 to be developed further. PRA was announced on Option 2 and Statutory Consultation carried out on this option, now called the scheme.

Further details of the long-list appraisal can be found in the Stage 2 Business Case.

3.5 Recommendation

The existing economic appraisal demonstrates that this option delivers substantial benefits and presents a Medium Value for Money.

The scheme demonstrates how it encourages economic growth by increasing total vehicle flow with an increase in 2040 of over 15,000 AADT compared to the 'without scheme' scenario.

The modelling indicates the following time benefits:

- There is a reduction in journey times in both directions during all time periods.
- The PM period experiences the largest time benefits in both directions of approximately 5 to 6 minutes in 2025 and around 7 minutes in 2040.
- The AM period notes time benefits of approximately 4 to 5 minutes in 2025 and 6 to 7 minutes in 2040 in both directions.

As part of the wider economic benefits analysis, it is estimated that the scheme will provide a long-term positive impact of £65.22m. The WEI benefits are primarily derived from the agglomeration impacts. This indicates that businesses will benefit from the enhanced connectivity and congestion reductions brought about by the Tuddenham scheme.

3.6 Critical success factors assessment

CSF	Reason for criticality
Safety	Reduce the number of Killed or Seriously Injured (KSI)
Sustainability	Ensure environmental constraints are met – air and noise pollution impacts are not worse than the existing.
Time	To be open for traffic during 2026
Cost	Be delivered within budget allocation from MP and NH IDC and IC
Quality	Meet or exceed standards and specifications in DMRB, Eurocodes, MCHW, SHW, relevant IANs, BDs and PDs
Scope	Accommodate traffic movements for the DY of 2040
Benefits	Achieve BCR of 1.5 or more
Functionality	Improve journey time reliability

3.7 Qualitative assessment

There is only one option assessed for the Strategic Road Network (SRN) as part of stage 5. All other options put forward have been discounted in the sifting process described in section 2.4.1 and 3.2. The preferred option was the only one capable of delivering the objectives of the scheme.

The new offline dual carriageway provides a reduction in congestion-related delay, improves journey time reliability and increase the overall capacity of the A47. Operational assessment shows that scheme will provide free flowing traffic condition in increased demand scenarios. High growth sensitivity test also indicate that the scheme will accommodate additional demand growth and support development across the Peterborough, Norwich and Great Yarmouth A47 corridor.

Below is the qualitative impact resulting from the assessment. More details related to each category can be found in the Benefits Register.

Landscape

Overall, the scheme will have a slight impact.

Townscape

Overall, the scheme will not have an impact on the townscape character of the settlements.

Historic Environment

Overall, the scheme will have a slight adverse impact on the historic environment.

Biodiversity

Overall, the scheme will have a large adverse impact on biodiversity.

Water environment

Overall, the scheme will not have an impact on the water environment in the area.

Physical activity

Overall, the scheme will not have an impact on active mode provision, as it is an inter-urban scheme.

Journey quality

Overall, the scheme will have a slight beneficial impact on journey quality.

Accidents

Overall, the scheme will have a moderate beneficial impact on safety.

Security

Overall, the scheme will have a moderate beneficial impact on security.

Access to Services

Overall, the scheme will not have an impact on access to services in the area.

Affordability

Overall, the scheme will have a slight adverse impact on affordability.

Severance

Overall, the scheme will not have an impact on severance.

Option and non-use values

Overall, the scheme will not have an impact on public transport, therefore no impact on option and non-use values.

3.8 Benefits assessments

Following delivery of the scheme it will be important to determine whether the forecast impacts of the scheme and anticipated benefits have materialised. As such, a robust strategy will be put in place for both benefits realisation and the associated monitoring and evaluation. A Benefits Realisation Plan and Monitoring and Evaluation Plan will be developed in line with the relevant guidance to ensure that a process is in place to assess whether the scheme objectives have been successfully realised. As part of this plan, a programme of monitoring will be established from pre-construction, through scheme construction and for a period of up to 5 years post scheme opening.

The user benefits of the scheme are the savings in travel time and vehicle operating cost, accrued over 60 years following the assumed opening of the scheme in 2025. Journey time savings and changes in vehicle operating costs have been calculated for the representative scheme, compared to the Do-Nothing, using TUBA 1.9.17.

Safety is considered a benefit as a reduction in collisions has been calculated using Cobalt v2.10 (consistent with TAG databook July 2021). Collisions have been assessed using a combined link and junction-based assessment. In the Do Minimum, link type 8 has been assumed which represents a single carriageway A road designed to modern standards. In the Do Something, link type 10 has been assumed which represents a dual carriageway with two lanes in each direction designed to modern standards.

From the analysis to date, the respective benefits are for journey time savings, vehicle operating costs and accidents, but also the following could be observed:

Changes In Noise

Noise is expected to worsen around sensitive receptors as vehicles will travel faster due to reduced congestion, and the dualling of the carriageway will accommodate larger amount of traffic - this will generate more noise overall. The value of these benefits over 60 years, in 2010 prices discounted to 2010 is -£1.4 million.

Air Quality

Air quality benefits over the 60-year appraisal period were computed using the standard TAG Air Quality Workbook. The value of these benefits over 60 years, in 2010 prices discounted to 2010 is £2.45 million. Air quality is expected to improve near sensitive receptors as a result of the scheme as more vehicles are encouraged onto more freely flowing carriageways. Due to lower levels of congestion, there is less idling and stop-start driving, has positive impacts on air quality.

Changes In Green House Gas Emissions

The reduction in travel times through the network results in emission reductions, although this is offset by increased traffic flows which are suppressed in the Do-Minimum scenario by elasticity of demand. The value of these benefits over 60 years, in 2010 prices is -£53.67 million. Greenhouse gas emissions will increase as vehicles are travelling faster and consuming more fuel due to reduced congestion as a result of the scheme, as well as during the construction period.

Wider Impacts

The value for the total WEIs is £65.22 million, confirming that there will be an overall, long-term positive impact from the scheme with the highest contribution coming from agglomeration impacts.

The benefits captured in the Present Value of Benefits (PVB) are largely driven by journey time benefits experienced on trips through the route; these are supplemented to a limited extent by accident savings, and indirect tax revenue. The benefits are offset to a degree by vehicle operating costs and the cost to the broad transport budget.

The identified benefits would also be supplemented by journey time reliability improvements for each option. Journey time reliability is typically impacted by two main sources: incidents and congestion. Incidents are those which reduce or stop carriageway capacity, typically accidents or vehicle breakdowns. Congestion effects journey time reliability when the flow exceeds capacity and a break down in the flow occurs. Anecdotal evidence suggests that journey time reliability on the A47 is also affected by the presence of agricultural vehicles and limited safe overtaking opportunities. The journey time reliability benefits for the scheme are £6.86m.

Other benefits such as regeneration effects have not been monetised at this stage, relying on the regional growth scenario to determine the level of regeneration expected for the scheme. It is recognised that there is the potential for benefits to be derived from the scheme, including:

- Expected journey time benefits for business users will help support planned residential and employment regeneration in the Norwich Area.
- Improvements in journey times will improve access to services in Norwich from the areas local to the scheme.
- Benefits in journey time savings will improve resilience and reliability which directly affect journey quality, predominantly associated with traveller stress; and
- Benefits in journey time savings will result in fuel efficiencies for all users.

There are a number of local development projects which have been put forward to local planning authorities via Local Development Order (LDO) Application and responses to call for sites from Breckland, Broadland and South Norfolk District Councils which are likely to positively impact the economic scheme.

Dualling the A47 would address the two main typical sources impacting journey time reliability:

- the A47 would be more resilient to incidents and the increased capacity would reduce the incidence of congestion causing a break down in flow.
- the effect of the presence of agricultural vehicles would be reduced by providing a second lane which other vehicles could use to overtake.

Further details can be found in the Stage 5 ComMA Technical Note.

3.9 Cost assessments

The PCF Stage 5 ComMA sets out the key assumptions and parameters involved in the economic assessment of the A47 North Tuddenham to Easton route.

Scheme construction costs have been estimated by the National Highways Commercial Team and were received in May 2024.

The expenditure profiles are based upon cost estimates for each financial year and then inflated to outturn costs using projected construction related inflation. These costs have then been rebased to 2010 calendar year profiles for economic calculations, using the Gross Domestic Product (GDP) deflator series, as published in the latest TAG Databook (November 2023, v1.22). All the costs are in factor cost unit of account and exclude VAT, both recoverable and non-recoverable. All spend to date (historic cost) has been removed as these costs are considered as sunk costs and not included in the economic appraisal.

The total value of the construction cost in 2010 market price unit of account (Present Value Cost - PVC) for the scheme is £110.62m with an assumption that none of the costs will be funded from developer contributions. The total scheme cost includes the following items:

- Investment costs relating to the preparation and construction of the scheme
- Operating and maintenance costs

3.10 Cost benefit analysis

The scheme benefits are a combination of different elements which are dependent on network capacity, average speeds, number of trips, cost of travel, tax, etc. The total benefits, PVB, include the following items:

- Travel time, which is assessed within TUBA software.
- VOC, assessed within TUBA.
- Accident benefits, assessed within COBA-LT
- Indirect tax revenues, assessed within TUBA.
- Construction and maintenance user delays, assessed within SATURN and TUBA
- Environmental impacts, assessed in accordance with TAG unit A3.
- Journey time reliability, assessed in accordance with TAG unit A1.3
- Wider economic impacts, assessed in line with TAG unit A2.1

The total scheme costs, PVC, include the following items:

- Construction costs relating to the preparation and construction of the scheme.
- Operating and maintenance costs

Stage 5 AMCB table

Item	Stage 4 Monetary Value (£m's)	Stage 5 Monetary Value (£m's)
Noise	-£1.42	-£1.42
Air Quality	£2.45	£2.45
Greenhouse Gases	-£37.70	-£53.67
Accident Savings	£14.72	£12.72
Economic Efficiency: Consumer Users (Commuting)	£57.91	£40.29
Economic Efficiency: Consumer Users (Other)	£63.64	£52.95
Economic Efficiency: Business Users and Providers	£82.10	£76.09
Wider Public Finances	£16.93	£7.92
Level 1 PVB	£198.64	£138.83
Broad Transport Budget PVC	£122.88	£110.62
Level 1 NPV	£75.76	£28.21
Level 1 Benefit to Cost Ratio (BCR)	1.62	1.26
Reliability Benefits	£6.86	£6.86
Wider Economic Benefits	55.77	£65.22
Level 2 PVB	£62.63	£72.08
Adjusted PVB (Level 1 + Level 2)	£261.26	£209.42
PVC	£122.88	£110.62
Adjusted NPV (Level 1 + Level 2)	£138.38	£100.62
Adjusted BCR (Level 1 + Level 2)	2.13	1.89

Overall, the Stage 5 initial PVB is lower at £138.83m compared to £198.64m during Stage 4. The adjusted PVB goes from £261.26m at Stage 4 to £209.42m at Stage 5. In addition, a slight decrease is indicated within the BCRs, as at Stage 5 the initial BCR drops to 1.26 from 1.62 during Stage 4. The adjusted BCR also drops from 2.13 at Stage 4 to 1.89 at Stage 5.

The results of the economic appraisal for Tuddenham scheme are summarised in the AST contained within the Benefits Register Share file and the ComMA.

3.11 Sensitivity | risk and issues management | risk profile

Various sensitivity tests have been undertaken considering changes to traffic growth and uncertainty of assumptions as agreed with National Highways.

An update to the NTEM scenarios was necessary to evaluate the impact of the November 2023 TAG Databook on both the modelling and economic assessments. The transport modelling has been updated with new Pence Per Minute (PPM) and Pence Per Kilometre (PPK) parameters and the economic appraisal has been updated, notably the Transport Users Benefit Appraisal (TUBA), COst and Benefit to Accidents – Light Touch (COBA-LT), Wider Impacts in Transport Appraisal (WITA) and greenhouse gases assessments. This addendum details the results and highlights the comparisons between the TAG Databook's (May 2022, January 2023, and November 2023), showing the impact of the updated TAG parameters.

The following scenarios have been run as part of this analysis:

- o NTEM 8 Core
- o NTEM 8 Low growth
- o NTEM 8 Mode balanced decarbonisation
- o NTEM 8 Vehicle led decarbonisation

The AMCB table as shown in the ComMA Technical Addendum can be found below:

		January 2023 Core (NTEM 8)	November 2023 Core (NTEM 8)	November 2023 Low Growth (NTEM 8)	November 2023 Mode Balanced (NTEM 8)	November 2023 Vehicle Led (NTEM 8)	
Benefits	Consumer Commuting User Benefits	Travel Time	£52.01	£48.64	£41.16	£42.66	£56.50
		VOC	-£4.58	-£3.43	-£3.37	-£4.82	-£3.59
		Construction Delays**	-£4.91	-£4.91	-£4.91	-£4.91	-£4.91
		Net Consumer User Benefits	£52.52	£40.29	£32.86	£32.92	£48.00
	Consumer Other User Benefits	Travel Time	£91.16	£78.80	£69.08	£57.34	£105.40
		VOC	-£24.04	-£22.00	-£20.74	-£21.55	-£27.07
		Construction Delays**	-£3.85	-£3.85	-£3.85	-£3.85	-£3.85
		Net Consumer User Benefits	£63.26	£52.95	£44.50	£31.94	£74.48
	Consumer Business User Benefits	Travel Time	£76.09	£74.68	£65.00	£65.53	£84.19
		VOC	£7.46	£6.13	£5.40	£6.20	£10.51
		Construction Delays**	-£4.72	-£4.72	-£4.72	-£4.72	-£4.72
		Net Business User Benefits	£78.83	£76.09	£65.68	£67.00	£89.97
	Accidents Benefits		£14.72	£12.72	£10.91	£11.41	£13.25
	Indirect Tax Revenues		£9.23	£7.92	£7.89	£17.96	£1.12
	Noise**		-£1.42	-£1.42	-£1.42	-£1.42	-£1.42
Air Quality**		£2.45	£2.45	£2.45	£2.45	£2.45	
Greenhouse Gases - Tailpipe		-£18.44	-£45.76	-£42.41	-£13.62	-£21.15	
Greenhouse Gases - Construction & Maintenance		-£11.03	-£7.89	-£7.89	-£7.89	-£7.89	
Greenhouse Gases - Operational		-£0.06	-£0.03	-£0.03	-£0.03	-£0.03	
Initial PVB (£m)		£190.06	£137.33	£112.56	£140.74	£198.80	
Costs	Operating and Maintenance Costs**		£0.58	£0.58	£0.58	£0.58	£0.58
	Investment Costs***		£129.39	£110.04	£110.04	£110.04	£110.04
	PVC (£m)		£129.97	£110.62	£110.62	£110.62	£110.62
Initial NPV (£m)		£60.09	£26.71	£1.95	£30.12	£88.18	
Initial BCR		1.46	1.24	1.02	1.27	1.80	
Benefits Level 2	Journey Time Reliability		£6.86	£6.86	£6.86	£6.86	£6.86
	Wider Economic Impacts		£55.45	£65.22	£54.36	£56.06	£71.48
	PVB (Level 2)		£62.30	£72.08	£61.22	£62.92	£78.34
Adjusted PVB		£252.36	£209.41	£173.78	£203.66	£277.14	
Costs	PVC (£m)		£129.97	£110.62	£110.62	£110.62	£110.62
Adjusted NPV		£122.39	£98.80	£63.16	£93.04	£166.52	
Adjusted BCR		1.94	1.89	1.57	1.84	2.51	

All monetary values are presented in 2010 prices and discounted to 2010 values

3.12 Options impacts

As only one DS scenario was modelled, no comparative option assessment was undertaken in Stage 5.

3.13 Detailed benefit, cost and impact appraisal

More details of benefits, cost and impact beyond that described in sections 3.8-3.10 above can be found with the Stage 5 ComMA [and the Technical Note Addendum](#).

3.14 Breakeven and whole life value assessment

The North Tuddenham to Easton scheme has a BCR of 1.89. This means the breakeven point is part way through the 60 year appraisal period, at which point the benefits accrued so far would out-weigh the scheme costs.

This calculation ignores maintenance costs, indirect tax revenues, accident saving benefits, vehicle operating costs, benefits during construction, reliability benefits and several other monetised costs and benefits that tend to be smaller in value.

4. Commercial case

4.1 Required services

The key activities for the delivery of the project for each of the remaining stages, as per the PCF guidance, are as follows:

PCF Stage 4 – Statutory Procedures and Powers

- Make Orders and await end Decision from legal challenge court hearing.
- Agree Section 4 agreement with CEC to permit construction work on their network.

PCF Stage 5 – Construction Preparation/Detailed Design

- Obtain approval to any advance works or advance statutory undertakers diversions.
- Complete the detail design for the project and seek all necessary approvals.
- Agree costs of construction with the supplier and obtain pre-construction estimate from NH Cost Planning team.
- Produce the final business case.
- Identify and obtain by agreement land for temporary site compound.
- Obtain notice to proceed.

PCF Stage 6 – Construction, Commissioning and Handover

- Construct and commission scheme
- Hand over asset for operation with as-built drawings and health and safety file
- Open scheme to traffic

PCF Stage 7 – Closeout

- Agree final account with contractor.
- Contractor completes outstanding works (or re-work)
- Complete a review of project delivery.
- Initiate POPE process

The supply chain will lead on these activities or assist the NH project team as appropriate. Details of the required services and deliverables are stated in the scoping documents issued to the supplier.

4.2 Market analysis

The Routes to Market (RtM) programme was established by National Highways in March 2016 to consider and develop the most appropriate procurement routes for National Highways' major programmes of work arising from the Road Investment Strategy period 1 2015-2020 (RIS1) and Roads Investment Strategy period 2 2020-2025 (RIS2).

To achieve our long-term ambition, we have two delivery partner Frameworks in place, sourced centrally within National Highways, in line with Government procurement routes:

- **Regional Delivery Partnerships:** The delivery vehicle covered by this paper procured for a six-year term and with a forecast expenditure of £9bn. The initial focus will be on delivering the remainder of RIS1 and flexibility to adapt to manage with the early elements of RIS2 once it is defined. This partnership will appoint the Delivery Integration Partner (DIP, in essence the Design and Build Contractor for Stages 3 to 7 inclusive.)
- **Technical Advisor (1):** A collaborative framework of consultant appointment to work on behalf of National Highways, to support the Stage 1 and Stage 2 works as Designer, while transitioning to be Technical Advisor for Stage 3 to 7 inclusive. This framework will be adopted for Stage 3 onwards.

The Regional Delivery Partnerships are designed to move from transaction based on simple collaboration environment to integrated relationships focused on improving investor value.

The A47 North Tuddenham to Easton Scheme forms part of the Band **B** Lot **7** package. The scheme is packaged along with all A47 Programme Schemes.

Galliford Try were the successful parties within this Lot and as such have been awarded the programme of A47 schemes.

Under the RDP framework, where multiple schemes are added, each individual scheme forms a separate Scheme Contract between NH and the DIP. Therefore, each scheme can enter construction based on its own programme and, should a scheme no longer be progressed, this does not impact the delivery of the remaining schemes in the package.

Procurement of the Delivery Integration Partner and the mobilisation period was completed in 2019. The procurement for Technical Advisors was completed in 2019.

Technical Advisers for the scheme were procured under the existing CDF. The TAs provide technical and design assurance for the project to support National Highways in ensuring the design produced by the DIP is fit for purpose and meets the Client Scheme Requirements.

4.2.1 Supplier relationship

As set out in its Strategic Business Plan 2015-2020, the development of effective relationships between National Highways and its partners in a collaborative working environment is an integral part of delivering a safe, efficient network to the full satisfaction of customers. This includes the creation of integrated delivery teams with its supply chain to create a singular commercial approach. By working collaboratively with its suppliers, National Highways can draw on knowledge and best practice from the UK and overseas, promoting innovation, efficiency and the delivery of best value.

Regional Delivery Partnerships incorporate the operating relationships between the Delivery Integration Partners, Technical Advisors and National Highways. This offers the maximum opportunity to realise the benefits and outcomes for the Routes to Market procurement strategy and critically the delivery of the RIP. The Regional Delivery Partnerships delivery model has been designed to support moving from an asset-based development environment to one focused on improved value. This is in line with other transformational changes within the wider National Highways portfolio of directorates.

Within each region, National Highways, Delivery Integration Partners and Technical Advisors will be incentivised to work collaboratively together to deliver the outcomes of the programme.

4.2.2 External factors

As a public body, National Highways is bound by UK procurement directives, including the Public Contract Regulations 2015. Following the UK's departure from the European Union, the EU-UK Trade and Co-operation Agreement (TCA) will govern the procurement rules with the European Union. National Highways is committed to working within the UK legislation providing the principles of transparency, equal treatment and non-discrimination. The contracts pipeline sets out our purchasing intentions and approach over the period of the second Road Investment Strategy (RIS2) 2020 – 2025.

4.3 Commercial and procurement strategy, including procurement options

A key component of RIP's maturity development is to improve commerciality. The aspiration is that RIP commerciality is improving with a structured programme of activity to empower delivery; with teams to act intelligently when demanding efficient and predictable performance from suppliers under CDF and Regional Delivery Partnerships.

To achieve National Highways long-term ambition, NH has a two-stage strategy:

- **Regional Delivery Partnerships:** The delivery vehicle covered by this paper procured for a six-year term and with a forecast expenditure of £9bn. The initial focus will be on delivering the remainder of RIS1 and flexibility to adapt to manage with the early elements of RIS2.
- **Enterprise Partnerships:** A future vehicle that will cover the delivery of the large part of RIS2 schemes and preparing for RIS3 delivery. The intention is that these partnerships will represent an even closer relationship between National Highways and our suppliers.

This approach was developed by RIP in partnership with Commercial & Procurement, with the detailed activities shown below.

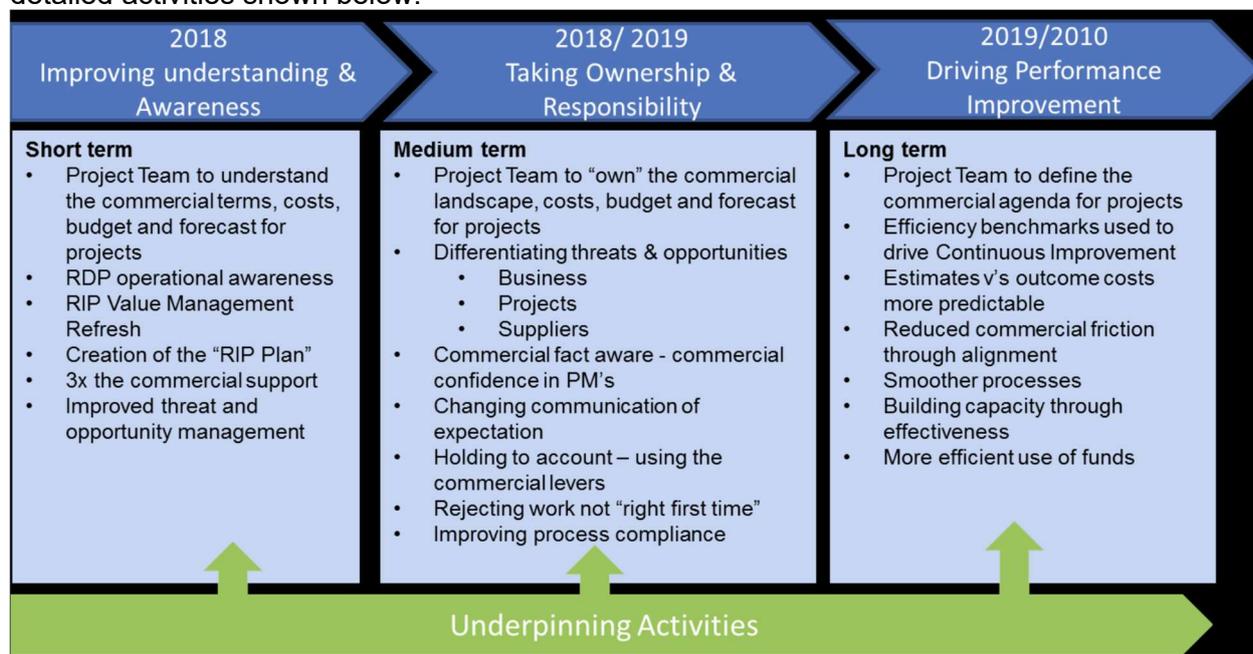


Figure 4.2- RIP's Future Aspirations

The approach to supplier incentivisation proposes a "triple lock" of financial gain, continuity of work and reputational value through improved performance to support sector growth and organisational success. The incentives will ensure alignment between Technical Advisors and DIPS to achieve outcomes aligned to our imperatives of safety, customer service and delivering the RIS.

The proposed commercial framework is therefore founded on the principle that supplier performance will be driven at two levels:

1. Scheme Level – by monitoring individual scheme outcomes at supplier scheme level; and

2. Lot Level – by monitoring supplier performance on all schemes awarded to them within a specific Lot inform the allocation of future workload.

The packaging strategy has been developed to achieve the following outcomes:

Programme level efficiencies – reducing overheads and transaction costs, resulting in efficiency targets being realised.

1. A deliverable programme – reflecting supplier capability and capacity to support new core and specialist supplier entrants to the market that are committed to delivering the programme.
2. Enhanced pipeline visibility – enabling greater programme planning and securing supply through long-term contracting.
3. Drive innovation – longer-term supplier engagement to develop supplier confidence and drive inward investment.
4. Continuous improvement – awarding manageable packages upfront and tracking performance to enable the best allocation of future work.

The A47 North Tuddenham to Easton Scheme has used the Regional Delivery Partnership (RDP) to procure the delivery partner, Galliford Try, for the remainder of the project. This is a major NH framework and as such is OJEU compliant. The Design and Build (D&B) contract will be NEC4, Engineering and Construction Contract, Option C Target Contract with Activity Schedule. The contract includes appropriate incentives agreed at a package and project level.

4.3.1 Commercial estimates, performance management and commercial assurance

The history of previous range estimates can be found here - Cost Estimating <https://share.highwaysengland.co.uk/Share/llisapi.dll/link/29470665>).

The project is within Delivery Integration Package B7, which was awarded to Galliford Try in 2019. The Partner has progressed through mobilisation, due diligence and Development Phase activities and the scheme is currently ready to move to construction.

The Target Outturn Cost was originally set at £127.3m in 2019. During early PCF Stage 3 itself, it was identified that the two grade junction design needs changed to elevated junctions with bridges and roundabout. This change was agreed in December 2021 and the TOC was provisionally agreed to £195m with IDC approval in Jan 2021.

Following the legal challenge to the Development Consent Order, the Target Outturn Costs was adjusted to reflect the impact of the legal challenge and treatment of NR VAT and account for the unprecedented inflation adjustment provided for under the RDP Framework Deed of Variation. Supplier Galliford Try have signed Deed of Variation 2 which addresses any inflation impacts on the scheme costs in line the IOPI. Currently the inflation (within TOC) is calculated using current inflation model with DOV 2 (Inflation Calculations in Budget V1.1.2). This model uses IOPI + forecast of CPI+200 basis point to end of RIS 2 and a forecast provision beyond. A Scheme Budget within the updated Targeted Outturn cost value of £275.1m has been agreed with Galliford Try.

Galliford Try have submitted a Total of the Prices (TotP) to National Highways for assurance. The quantities and prices have been independently assured and verified by our commercial partner and adjusted where agreed. The Programme and risk register submissions have been assured and verified by National Highways Risk & Planning team. The submission has also been assured by the National Highways Technical Assurance partner.

The latest Pre-construction Estimate was produced in May 2024 and included additional adjustments related to the ongoing legal challenge. This will also be used to determine the revised scheme funding request within the July 2024 IDC and IC funding submission and has also been used to recalculate the BCR and VfM statement.

A copy of this estimate can be found here (A47 North Tuddenham to Easton - SGAR 5 - PCF Product - Pre-Construction Estimate
<https://share.highwaysengland.co.uk/Share/llisapi.dll/link/110027003>

At the time of refreshing the commercial estimates, there was still an appeal challenge on the court decision. The pre-construction estimate produced by cost planning team includes a risk allowance to account for this.

Contracts will be managed through the CEMAR system, a change management system brought in as part of the MP Change Programme. The Project Manager is responsible for administering the contract with the support of the regionally based commercial teams, as well as the NEC PM who is brought in through the CPMS Framework.

4.3.2 Delivering and measuring efficiencies

The efficiency target will be demonstrated by providing evidence to support the efficiency types, primary evidence will be provided to monitor all efficiency, secondary evidence will be provided for assurance where needed.

The A47 North Tuddenham to Easton efficiency target is £12.48m and this is being monitored on a monthly basis. Opportunity workshops are also taking place quarterly.

Supplier performance is measured quarterly under the Collaborative Performance Framework (CPF).

4.4 Risk and issues management

4.4.1 Risk allocation and transfer

Project team review the Threats and Opportunities regularly and allocated between the employer and the contractor. A cash flow forecast is agreed for whole of Development Phase works with the supplier.

The scheme has regular monthly risk reviews which are led by the supplier risk manager and assured by the Project Controls Risk Manager and Regional Risk Manager. Risk logs are maintained and managed through the employer platform (Xactium) allowing full control over all its data. The scheme uses this data to inform QCRA monthly and [QSRA](#) on a quarterly basis to give the team appropriate foresight of proximity risks and threats to the projects to inform mitigation plans.

The register undergoes regular assurance by the team to ensure it is robust. The current assured risk position (post mitigation EMV) in May 2024 is reflected in the Pre-construction Estimate.

The RDP procurement strategy includes relevant risk mitigation clauses (Table 4.3). Also Scheme level and Package level incentivisation model derived for RDP does encourage a collective Threats and Opportunity management process.

Table 4.3 Risk Mitigation Clauses in DIP Procurement Strategy

	Description
1	Any exit route is based on fair payment of actual cost.
2	There is a 'terminate at will' clause for all schemes – "circuit breaker". Exposure is actual costs only.
3	A requirement to complete Mobilisation deliverables prior to being appointed a scheme contract – quasi condition precedent means that suppliers will have

	been quality and behaviourally assured before being awarded scheme contracts
4	In addition, there are Stage gate exit routes in the contract prior to DCO submission and Notice to Proceed.
5	There is a defined “not to exceed” cap specified for each scheme where the definition is equal to the DIP BUDGET or HE current expected funds available.
6	At all Stages financial commitments are fixed or capped costs or target costs with overspend exposure “pain” carried fully by the supplier to the level of its Business OH and Profit.

The project is a single scheme under the B7 package within the RDP and it is being delivered in collaboration with Galliford Try and their Designer Sweco, having Atkins Realis contracted for the role of Technical Advisor. The currently approved DIP budget has a Risk distribution between Contractor and Client as follows:

- Contractor Risk = £10.61m
- Employer Risk = £1.74m

The top risks for the scheme as of May 2024 are:

	Risk Title/Cause	Risk Event	Risk Impact	Risk Action Plan
1	Topsoil Quality - Nutrient High Topsoil removed during early archaeological works and other soil removal across the duration of the scheme is of too high nutrient value to support a low nutrient/low maintenance planting regime (agricultural land treated to be nutrient high for crops).	There is a risk that topsoil removed may be unsuitable to reinstate.	Additional cost of disposal Additional cost to import new topsoil	<ul style="list-style-type: none"> • Trial panels to be set up in specific segregated planting areas to monitor reduction in nitrates by plants. • Monitor trial panels for effectiveness in reduction of nitrates at intervals across the life of the scheme.
2	Unanticipated Extreme Weather Conditions Unexpected extreme weather conditions over & above the agreed level stated in the contract as per agreed weather station	There is a risk of delay, prolongation or damage to works completed / underway due to an unexpected weather event	1. Delay to works 2. Additional cost 3. Potential remediation 4. Risk of repetition of flooding experienced 2023/24 5. Reputational impact of the above if perceived flooding is caused by the scheme.	<ul style="list-style-type: none"> • Programme activities to most suitable time of year & maintain awareness of weather trends / forecasts • Review past weather trends • Installation of haul roads in area of high risk of flooding • Installation of pre-earthworks drainage to prevent damage to permanent works • Planning bulk earthworks for the right times of the year to be most efficient

3	<p>ISSUE: Oak Farm Flood Bund – Construction</p> <p>Flood bund is no longer considered having reservoir status (as defined in the Reservoirs Act 1975) but some necessary elements of redesign to achieve this will be more costly than original design. Final design and cost still to be understood.</p>	<p>ISSUE: There is a risk of increased costs to construct the flood bund to remove the reservoir status.</p>	<p>Additional costs to the scheme.</p>	<ul style="list-style-type: none"> • Check whether change to reservoir status constitutes a material change to the DCO • Panel engineer to produce design and report • Matt to obtain a briefing from Barrie A (SWECO) to better understand the revised design to remove the reservoir standards, and impacts. • SWECO reviewing flood bund design internally
4	<p>R50943 - Increase in Bat surveys and assessments</p> <p>Amended legislation in 2023 changing how trees are assessed</p>	<p>There is a risk of increase in bat surveys and assessments required.</p>	<p>1. Additional cost of mitigation measures. 2. Additional time to complete mitigation. 3. Impact to vegetation clearance activities. 4. Delays to construction activities.</p>	<ul style="list-style-type: none"> • Surveys to be undertaken to assess the position - may mean more trees have to be added to the licence.
5	<p>R50297 - Issue: Drainage Design Post Design Fix E</p> <p>Drainage design E has evolved and more elements added such as culverts and headwalls.</p>	<p>ISSUE: There is a risk of drainage costs exceeding what was expected at the last design fix.</p>	<p>Additional costs to the scheme.</p>	<ul style="list-style-type: none"> • Review and update take off of drainage design

4.4.2 Limits of liability

Limits of liability for Stages 5, 6 and 7 were as part of the commercial processes within the Routes to Market (see Section 4.3 Commercial and procurement strategy and procurement options).

The regional delivery partner (RDP) Procurement Strategy has numerous risk mitigation clauses built in. These allow National Highways to progress contract award with minimal risk. Risk mitigation clauses are:

Any exit route is based on fair payment of actual cost.

- There is a 'terminate at will' clause for all schemes – “circuit breaker”. Exposure is actual costs only.
- A requirement to complete Mobilisation deliverables prior to being appointed a scheme contract – quasi condition precedent means that suppliers will have been quality and behaviourally assured before being awarded scheme contracts.
- In addition, there are Stage gate exit routes in the contract prior to DCO submission
- There is a defined “not to exceed” cap specified for each scheme where the definition is equal to the Statement of Funds Available (SOFA) or National Highways current expected funds available.

- At all Stages financial commitments are fixed or capped costs or target costs with overspend exposure “pain” carried fully by the supplier to the level of its business overhead and profit.

Insurance is offered by Willis Towers Watson, as part of the RDP projects portfolio, below is an overview of cover:

- Contractor’s “All Risks” Insurance = Minimum amount of insurance set out in the Contract Data will be the replacement cost of the relevant insured property.
- Third Party Public & Products Liability Insurance = Limit of indemnity fifty million pounds (£50,000,000) in respect of any one occurrence without limit to the number of occurrences in any annual policy period, but fifty million pounds (£50,000,000) any one occurrence and in the aggregate per annum in respect of liability arising out of products and pollution or contamination liability (to the extent insured by the relevant policy).
- Professional Indemnity Insurance = Limit of indemnity ten million pounds (£10,000,000) in respect of any one claim without limit to the number of claims in any annual policy period, but ten million pounds (£10,000,000) in respect of any one claim and in the annual aggregate per annum for liability arising out of pollution or contamination (to the extent insured by the relevant policy) and five million pounds (£5,000,000) in respect of any one claim and in the annual aggregate per annum for liability arising out of asbestos (to the extent insured by the relevant policy).
- Insurances required by law in the United Kingdom = Limit of indemnity as required by relevant legislation.

4.4.3 Human Resources general

There are no Transfer of Undertakings (protection of Employment) regulations 2006 TUPE considerations on this scheme.

During Stages 5-7, consultancy human resources for the project will be provided by Galliford Try, alongside their sub consultants (notably Sweco). Once again, Galliford try will be responsible for management and appointment of consultancy staff on the project. Just as before, any replacement of key people within the consultancy support team from Galliford Try, would be subject to the agreement of National Highways as Client.

4.5 Commercial and procurement recommendation

With the receipt of positive outcome from all assurance processes the scheme is now in a position to move to the Construction Phase. National Highways are content that the project can be delivered within the DIP budget with risks managed appropriately and are satisfied that the scheme should proceed with Galliford Try for PCF Stage 6 and 7.

5. Financial case

5.1 Applied accounting principles and tax

5.1.1 Real vs nominal values

Unlike the economic case, the financial case applies the actual (nominal) costs that are forecast. Budgets are set on a nominal base, which includes inflation in later years. The economic real values are rebased on 2010 calendar year profiles for Economic Calculations.

The expenditure profiles within the Economic output from the latest Commercial estimate of May 2024 are based upon the cost estimates for each financial year prepared at a base date and then inflated to outturn costs using NH projected construction related inflation. These costs have then

been rebased to 2010 calendar year profiles for economic calculations, using the GDP-deflator series as published in the TAG Data book.

In the Economic Case, the costs also exclude all VAT and all historic costs have been removed - previous years and an approximate of this year's spend that occurs in the past as well.

5.1.2 'Capex' vs 'Opex' analysis

The accountancy treatment progressing through the Development and Construction Phases will be in line with standard National Highways practice. As the resources are being employed in the construction of a Capital asset, the policy is to capitalise the costs.

All project costs will be capital i.e. on balance sheet.

If land take is required, provision will be made from the Government's Capital Annually Managed Expenditure (AME) budget accordingly. The trigger points for accounting the provisional liability are: Preferred Route Announcement (PRA) – Blight; and Start of Works/Made Orders – Compulsory Purchase Order (CPO), Part 1. When the claims are paid, the AME liability is reversed, and the payment is Capital Departmental Expenditure Limit (DEL). The main project expenditure will also be funded from the Capital DEL budget.

5.1.3 Values matched to financial years (including Capex depreciation)

The cash flow forecast for the life of the project, for each financial year is:

including table below

Affordability Profiles (£m)	Version	Date	Prior Years	Road Period 2					Road Period 3					RP2	RP3	Future Years	Total Project Cost
				20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29	29/30				
Capital Baseline	4.2	Mar-24															
Current Operational Plan (inc CRR drawdown) *	4.2.4	Jun-24															
Project Manager's current forecast		Jun-24															
Current forecast vs Capital Baseline																	
Current forecast vs Operational Plan																	
Funding Approvals (£m)																	
Funding previously approved by IDC		Sep-23															
Funding requested in this investment submission		Jan-00															
Total funding approved after this investment decision		Jan-00															
Actual spend to date		Jun-24															
Current forecast vs Total funding approved																	
*CRR (drawn down) / handed back previously																	
Additional Information (£m)																	
PM's forecast before third party contribution																	
Third party contribution																	
Project Manager's current forecast (cost to NH)		Jun-24															
Current Commercial Estimate		May-24															
Forecast vs Commercial Estimate																	

5.1.4 Non-recoverable VAT

The procurement approach for construction is as set out in the Commercial Case.

Non-recoverable VAT is included in the costs, which has been calculated based on an assessment of the proportion of the construction works that will take place outside the National Highways boundary.

The VAT is 16% recoverable.

5.1.5 Risk Contingency

The current most likely forecast construction risk is £9.2m contractor and £1.8m client. If the risk is realised, we would look to draw down from the client risk element of the DIP budget.

5.1.6 Third party funding

The scheme is not dependent on any third-party funding.

5.2 Financial Model

Financial governance will be in accordance with the National Highways Governance end to end process will be employed for this scheme.

National Highways operates according to an annual budgetary cycle, where it receives a set budget from central Government each year. One of the key financial constraints that National Highways operates under is therefore the need to ensure that spend is within the total budget allocated.

Under the PCF, funding for the continued development of an individual project is confirmed on a stage-by-stage basis, with consent granted to release funding for the next PCF stage by the Investment Decision Committee (IDC) at the end of the proceeding stage. Key investment decision point is at the end of PCF Stage 3 upon the application to DCO and at the end of PCF Stage 5 prior to construction commencing. Further details are provided in the Management Case. It is worth noting that under RDP funding approval has been sought for stages 3, 4, 5, 6 and 7.

RDP Estimate summary

Estimate	(£m)
Latest approved Commercial Range Estimate (May 2024)	Min: [REDACTED]
	Most Likely: [REDACTED]
	Max: [REDACTED]
Current Operational Plan (May 2024)	[REDACTED]
DIP Budget	£275.0 (2023 agreement; currently [REDACTED] subject to agreement)

5.2.1 Scope and full business case check on economic case

The high level requirements for the scheme are being achieved by the project and recorded within the Economic Appraisal section of this Business Case.

As noted within the Financial Case, the budget for the scheme is within the cost estimate most likely value.

5.2.2 Efficiency plan

The RDP contract contains embedded efficiencies which are built into the DIP budget for the scheme. The efficiency reporting process consists of a number of aspects which govern the process by which efficiency is identified, captured and reported within National Highways. The overarching principles for capture, valuation and reporting are laid out in the Efficiency and Inflation Monitoring Manual. These are the rules by which efficiency is to be reported, Economy, Productivity & Effectiveness:

- Economy - minimising the cost of resources used while having regard to quality.
- Productivity - relationship between outputs and the resources used to produce them.
- Effectiveness - extent to which objectives are achieved and the relationship between intended and actual impacts of a service.

The digital efficiency register contains a tabulated summary of the perceived opportunities for adding value. These opportunities are described, categorised, assessed and managed making best use of the knowledge, experience, and skills of the integrated project team. Control actions are assigned, monitored, and recorded.

Value Management Workshops identified potential efficiencies to be implemented to the designs and/or delivery of the scheme. These have been captured in the Digital Efficiencies Register and have been scrutinised by the NH Commercial team in order to ratify these efficiencies or not and provide feedback to the integrated team. This process is ongoing and will continue through all the stages of the scheme's lifecycle to maximise efficiency. The evidence obtained must ultimately satisfy the Office of Rail and Road (ORR) as to the existence and valuation of the efficiency.

Key tests will be to ensure that the person in charge of the register can provide adequate support to the existence, assumptions & calculations to support each efficiency claim. The person reviewing the register can justify the value and existence of the efficiency. The reviewing team consists of the Efficiency and Project Manager, Regional Programme Office, Financial and Commercial Assurance team and Central Efficiency team.

5.3 Affordability

The Delivery Integrated Partner (DIP) is in contract to deliver the scheme as part of the RDP contract. The DIP budget for the scheme as agreed in July 2023 was estimated to be in the region of £275.01m. Since then the scheme has undergone a further delay due to the JR and DIP budget is now being renegotiated. However, it is anticipated to be in the region of [REDACTED] which is [REDACTED] over the latest Operational Plan and [REDACTED] over the Capital Baseline for the scheme but remains [REDACTED] lower than the Most Likely assured cost estimate from May 2024.

The current EAC2 position is in line with the most likely Preconstruction Estimate of [REDACTED].

5.4 Funding recommendation

The DIP has been contracted to deliver the scheme in line with the set out DIP BUDGET agreement of £275.01m with executed DOV 2.

Assurance has previously been given on a DIP Budget of £127.79 as set in 2019. A further assured budget was agreed in 2021 of £195.27m

The September 2023 IDC submission was to seek approval for the higher agreed DIP budget of £275.01m.

This submission now in July 2024 is based on Commercial's recommendation that until the DIP budget negotiations have concluded the scheme's request to NH IC should be based on the most likely commercial estimate figure as of May 2024.

6. Management case

6.1 Management arrangements

This chapter will set out the processes, procedures and systems in place and to be utilised to facilitate the delivery of the project.

SHARE link to all project folders	http://share/Share/llisapi.dll?func=ll&objId=29470561&objAction=browse&viewType=1
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6.1.1 Transition and implementation plans

Following the implementation of the Delivery Integrated Partner, full transitioning has now been completed and the team are working as a fully integrated project team.

The scheme is progressing in accordance with the National Highways Major Project Control Framework (PCF) for managing major projects, undertaking an SGAR at the end of each PCF Stage in accordance with National Highways best practice. The PCF stages are summarised below.

PCF Stages



6.1.2 Resourcing requirements:

- Employees – resources are managed at corporate level for National Highways, Galliford Try, Sweco and Atkins Realis employees.
- Contingent worker – procurement of third party services are undertaken by the Delivery Integrated Partner
- Third party contractor (also known as Technical Services) – Atkins Realis have been contracted to fulfil the role of Technical Advisor for the delivery of the scheme.
- Consultancy and Professional Services – The Integrated Project Controls services have been contracted via Mott McDonald for commercial services and Arcadis for PM, Risk and Schedule services via the CPMS Framework.

The project team comprises both NH employees and external consultants. The core roles are identified below:

National Highways

PM: [REDACTED]
 (seconded from Arcadis through the CPMS Framework)
 NEC PM: [REDACTED]
 (seconded from Arcadis through the CPMS Framework)
 APM: [REDACTED]
 SPM: [REDACTED]
 Environment Lead: [REDACTED]
 Traffic Lead: [REDACTED]
 Project Sponsor: [REDACTED]
 Contracts Manager: [REDACTED]

NEC Supervisor: David Moore

Delivery Integrated Partner (Galliford Try)
Stage 5 Designer: SWECO

PM (GT): TBC

SPM (GT): [REDACTED]

Engineering Manager (GT): [REDACTED]

Stakeholder Manager (GT): [REDACTED]

Traffic Modeller (Sweco): [REDACTED]

Design Manager (Sweco): [REDACTED]

Technical Advisor Atkins Realis

PM: [REDACTED]

The following roles shown have key accountabilities for the scheme:

Regional Delivery Director:

Is accountable to the Programme Director.

Is accountable for the day to day delivery of the Programme in accordance with NH's License obligations, RIS obligations, Strategic Business Plan, Delivery Plan, and Policies and procedures and for the Programme business case and Championing and working within the Programme Committee ToR and Portfolio, Programme and Project Management Control Framework (PCF).

Project Sponsor:

Is accountable to the Programme Director and the Programme Internal Sponsor (as delegated by the Programme Director)

Is accountable for delivery of an MP Project in accordance with NH's License obligations, RIS obligations, Strategic Business Plan, Delivery Plan, Policies and Project Business Case and for Championing and, in the best interests of the project, working within the Project Committee ToR and Portfolio, Programme and Project Management Control Framework (PCF).

Project Manager:

Is accountable to the Project Sponsor (Chair), in respect of the Defined Outputs (i.e. the Brief) of Individual Projects.

Is accountable for the day to day delivery management of the Project in accordance with NH's Policies, License obligations, RIS obligations, Strategic Business Plan, and Delivery Plan and for the project business case.

The responsibilities and requirements of each role are described in Sections 6.2.1 and 6.2.3 below.

6.1.3 Stakeholders and communications

A Communication Plan has been developed during Stage 4 for Stage 5, and Stage 5 for Stage 6 and advance construction activities setting out the approach to engagement and communication with stakeholders. The plan describes the communication objectives, the key messages the stakeholders need to know about the scheme and the channels in which to convey messages to stakeholders.

Stage 5 Communications Plan
Stage 5 Communications Plan – Stakeholder Tracker
Stage 5 Communications Plan – Q&A
Stage 5 Communications Plan – Key Points

The Integrated Project Team is engaging with internal and external stakeholders demonstrating collaborative behaviours to deliver in line with our corporate communication objectives:

- 1) Establish meaningful “2 way” communication with Stakeholders specifically impacted by the scheme - Monthly update meetings held with Norfolk County Council, the Emergency Services and for handover with operational colleagues
- 2) To ensure primary stakeholders of the scheme feel informed about the scheme’s progress and future milestones. Monthly update meetings held with NCC
- 3) Monitor media and Stakeholder interest in the scheme and amend the Stakeholder tracker, lines to take and the Communications Plan as appropriate. Weekly comms meeting includes the press office to highlight media activity, inclusive of social media and press articles.
- 4) Ensure the project works towards the set Delivery Plan commitments and Transport objectives, any significant announcements are captured in the DfT 6 month look ahead.
- 5) To establish methods of engagement that allow environmental stakeholders to influence scheme design and help mitigate any environmental concerns regarding the scheme, as well help implement the recommendations of the DCO.
- 6) National Highways to coordinate with other traffic authorities that may be planning or carrying out works nearby (i.e. OD for the flood mitigation works). Monthly meetings held with traffic management teams.
- 7) Ensure that the public is fully aware of the dates and times of any proposed works. Monthly Newsletter issued to those that signed up to our distribution list and regular scheme website updates with key dates and activities.

Key Stakeholders:

- National Highways Major Projects,
- National Highways Operations Directorate
- National Highways Professional and Technical Services
- Delivery Integrated Partner and their Designer
- Norfolk County Council
- Environment Agency
- Natural England
- Cycling Groups
- Local MPs
- Local residents
- Local Businesses

6.1.4 Change control management

Change control ensures that all changes made to project’s baselined scope, time, cost, quality, objectives or agreed benefits are identified, evaluated, approved, rejected or deferred.

Effective change control will ensure that the stakeholders understand and agree the baseline scope and that a formal process for controlling change is implemented throughout the project.

Change request forms when approved through governance steps ensure that stakeholders have an understanding of rationale behind the change and have full knowledge of its impact. The Project Manager is responsible for managing the change process and the Sponsor has authority for approval.

The change control process between National Highways and DfT implies that any change to the RIS description must seek approval via Strategy and Planning team that will provide discussion and interface with the Ministry.

Changes are documented through Early Warning Notifications (EWNs) and Change Request logs and are approved by the Project Manager in consultation with the Programme Lead or SRO dependent upon the level of change. Any changes that the Project Manager considers could result in exceeding tolerance against in-year or phase budgets, baselines for the stage or phase, or affect the scheme's likelihood to meet any of its Delivery Plan Objectives would be escalated to the SRO and Project Committee.

At project level, tolerances in Stages 1 and 2, such as Quality Specifications for delivery and performance, for example, are reported via the Compensation Events process. In general, these tolerances are incorporated and outlined within the contractual terms and conditions. Tolerance to target dates and their risks are reported via Early Warning Notices to any Compensation Events.

Earned value targets have been set and are to be monitored monthly with the Supplier. The targets are:

- CPI / SPI >0.95

Lot 1 and 5 contracts within this phase are let under a NH tailored form of the NEC Professional Services contract on a target cost basis.

Lot 3 has been let on a cost reimbursable basis; CEs are submitted for any extension of time required.

6.1.5 Risk and issue management

Risk profile is based on the quantified risk register costed by National Highways Cost Engineers and taken forward to forecasts. An element of the supplier's identified "extraordinary items" is also included. The Risk Register is recorded on the relevant shared project workspace and the Risk Management Plan describes in detail how risk is identified, categorised, weighted and mitigated with accordance to the risk management manual. In essence the risk is identified using historic evidence, brainstorming, using working groups, monthly risk register updates and risk workshops. For each risk a clear understanding of Cause, Event and Impact is required before an assessment can be made regarding the rating levels of probability and impact can be assigned.

As of December 2017, the project team has been collaborating on the Risk Register with both the project team and suppliers using Xactium, a cloud-based risk management solution.

The main proximity risk for the scheme is about the topsoil nutrient quality. Topsoil removed during early archaeological works and other soil removal across the duration of the scheme is of too high nutrient value to support a low nutrient/low maintenance planting regime (agricultural land treated to be nutrient high for crops). The impact of this risk shows additional costs of disposal and import of new topsoil material. The project team is currently running trial panels to monitor the reduction in nitrates by plants. The results will feed into a business justification document which will be presented to the SLT for a decision on the right course of action, as this risk has a high cost associated with it, and at the same time is linked to the biodiversity KPI.

The top risks are presented in Section 1.7 of this document.

6.1.6 Benefits realisation plan

The scheme is in the development stage of the Project Lifecycle currently progressing through PCF Stage 4 and 5. A Benefits Realisation plan for the scheme will be produced in line with the National Highways Benefits Management process as part of PCF Stage 5. In terms of benefits the key benefits identified so far are:

- Decreased journey times between two locations for business users and transport providers
- Decreased journey times between two locations for commuting and other users
- Increased journey time reliability for commuting and other users

Following delivery of the scheme it will be important to determine whether the forecast impacts of the scheme and anticipated benefits have materialised. As such, a robust strategy will be put in place for both benefits realisation and the associated monitoring and evaluation. A Stage 5 Benefits Realisation and Evaluation Plan (BREP) is being developed in line with the relevant guidance to ensure that a process is in place to assess whether the scheme objectives have been successfully realised. As part of this plan, a programme of monitoring will be established from pre-construction, through scheme construction and for a period of up to 5 years post scheme opening.

[Share link to Stage 4 Benefits Register including Stage 4 Benefits Register](#)

[Share link to Stage 5 Benefits Register](#)

6.1.7 Customer considerations / planned communications before and during works

All necessary information can be found in the A47 North Tuddenham to Easton - Customer Plan - Review 11-05-23.

6.2 Programme / project management plan (PMP) and assessment

The project management process is succinctly articulated in the Project Management Plan (PMP) that provides answers to the following questions for a project scheme:

- **Why** is the scheme necessary? Based on the need, problem or opportunity to be addressed, including the benefits that will be delivered
- **What** are the objectives, scope and deliverables? How will success be defined and measured?
- **Who** will be deployed? What are the key roles and responsibilities and who will be discharging them?
- **How** will the project be managed and executed? Including governance arrangements, processes and resource. The how includes how much - outlining the budget and budget approvals, estimates, how expenditure and income will be managed
- **When** will the project be delivered? Including timescales, time constraints, commitments, milestones, phases and stages

The Stage 5 Project Management Plan can be found [here](#).

6.2.1 Governance, organisation structure and roles

The purpose of the Project Committee is to support the Project Sponsor and Programme Lead in the executive control of projects, by providing stakeholder and technical input to decisions affecting the scheme. Exception reports will be prepared for the Committee to review and manage any key changes on the programme that are likely to have an impact on the scheme objectives. Key project issues requiring escalation will be taken by the committee members to regional committee.

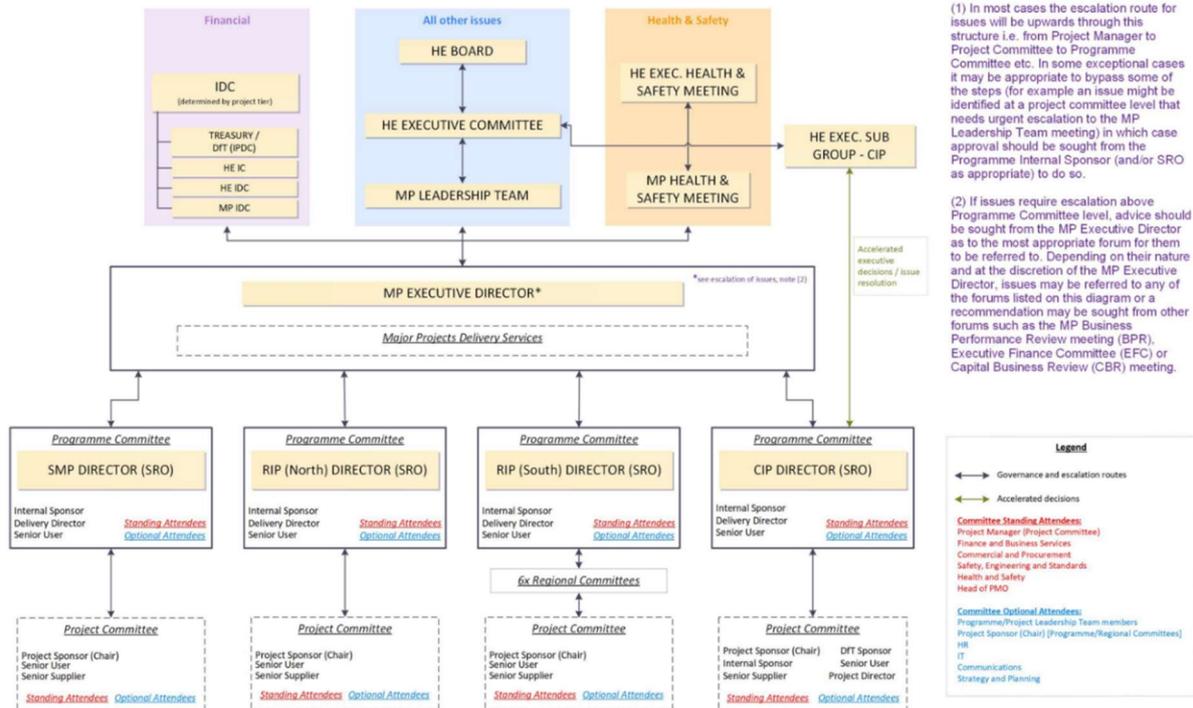
All changes are to follow the Commercial Management process. Any amendments to the scope of works will be raised as Early Warnings and if accepted, the change is then processed as a Compensation Event, in accordance with the contract.

The project is controlled by the National Highways governance processes and Major Project procedures such as the Project Control (PCF) delivery framework. The scheme will be subject to peer reviews and audits e.g. Gateway Reviews and Stage Gate Assessment Reviews.

The MP Governance model sits at the basis of how the scheme is being managed, as per the below diagram:

Governance model and escalation route for the MP Programme and Project Committees

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The Project has been organised at the following levels:

- Project Committee
- Integrated Project Team
- Design Delivery Team

The design, management and planning of assurance activities has been informed by the Stage 5 Integrated Assurance & Approvals Plan (IAAP)

The Project Committee was introduced in June 2017 following the issue of MPI-59-062017. The Committee performs a regular 'health check' on the project and validates the decisions of the Integrated Project Team. The Project Committee supports the Programme Lead (PL) and takes an overview of the project by managing by exception. The Project Committee meets monthly, as a minimum requirement.

The Project Sponsor is accountable to the Programme Director and the Programme Internal Sponsor (as delegated by the Programme Director)

The Project Sponsor is accountable for delivery of an MP Project in accordance with NH's License obligations, RIS obligations, Strategic Business Plan, Delivery Plan, Policies and Project Business Case and for Championing and, in the best interests of the project, working within the Project Committee ToR and Portfolio, Programme and Project Management Control Framework (PCF).

The Programme Lead has overall accountability for the delivery of the project ensuring the project remains focused on achieving its objectives. He has the authority to make decisions concerning the delivery of the project within a certain delegation.

The Programme Lead is responsible for: -

- Providing clear leadership and direction through the life of the project
- Ensuring the project governance arrangements comply with the PCF through: -
 - Review and sign off of key products.
 - Deciding the outcome of Stage Gate Assessment Reviews for medium and high-risk projects
 - Ensuring change is effectively managed and escalated appropriately.
 - Ensuring that the project is technically and financially viable and compliant with the National Highways corporate standards and strategic business plans.
 - Ensuring the project is ready to seek investment authorisation.
 - Managing the interface with key senior stakeholders

The Project Manager is the individual responsible for managing the development and the delivery of the project on behalf of the National Highways and on behalf of the SRO.

The Project Manager leads and manages the Project Team with the authority and responsibility to run the project on a day-to-day basis and is responsible for: -

- Managing the project on a day-to-day basis and delegations provided by the SRO.
- Being aware of the business objectives of the project and ensuring that these are satisfied.
- Ensuring that the project produces the required products, to the required standard of quality and within the specified constraints of time and cost.
- Establishing the project organisation, defining roles and responsibilities and deliverables for each team member
- Performing project planning, monitoring and control on the project
- Establishing the safety ethic within the project team and ensuring that the project complies with safety regulations.
- Providing a safe working environment for the execution of work directly under their responsibility

A47 North Tuddenham to Easton Team Organogram 2023
GT Organogram 2024

6.2.2 Reporting

The Project Committee has been chaired by the Project Sponsor and attended by the Senior User (OD representative) and Senior Supplier (usually the Supplier Director) and other attendees at the discretion of the Project Sponsor. The Project Committee has met monthly to effectively manage the project and will continue to do so moving forward into PCF Stage 6. Milestones and delivery targets, risks and issues are discussed at each meeting to manage the successful delivery of the programme.

The Project Manager has been responsible for reporting progress and other matters to the Project Committee. This has included highlight reports covering progress against milestones, key issues and risks, actual and forecast financial information, forward look, and items escalated to the Project Committee for consideration/a decision. This will continue through PCF Stage 6 to 7 as an effective way of providing information to project committee members.

On the first working day of the month a project performance review (PPR) meeting takes place with representatives from the PMO, project team, Finance Business Partner and Commercial team to review the project's finance and scheduling position. Changes to the project's forecast financial and schedule milestones are explained alongside mitigating actions and impacts. Strategic levers, i.e. opportunities within the project to accelerate / decelerate and amend spend profiles, alongside uncontrolled cost, i.e. financial risks, are discussed and escalated as appropriate.

On an ad-hoc basis, depending on need, the project team is producing various reports which feed into the decision-making process. These reports vary in type and nature, but they include information related to:

- Progress – Gantt charts, status reports
- Quality – registers, checklists
- Risk – register, checklists
- Finance – budgetary reports, cost variance in a form of a Dashboard
- Review/audit – checklists, recommendations, SGAR reports

6.2.3 Work streams

Within the project there are two key components in the current stage, the client and the supply chain team. Accountabilities of these functions are detailed below.

Internal Client Team – key accountabilities:

- Project management
- Stakeholder management
- Governance and assurance
- Business case and benefits realisation
- Value Management
- Risk Management
- Discharging Client duties under the CDM Regulations

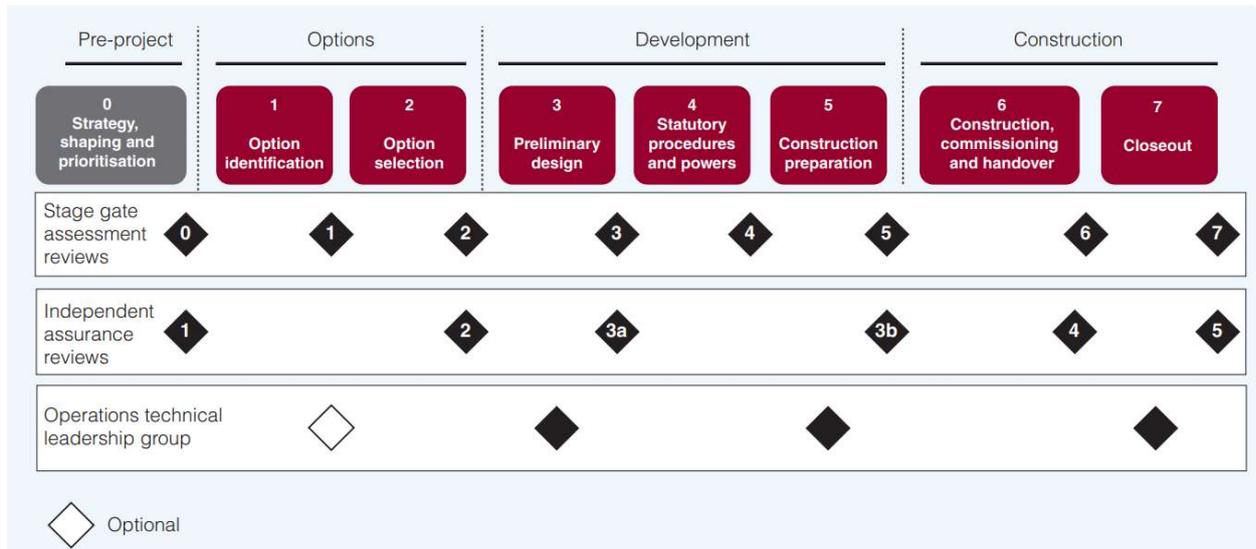
External Design/D&B team – key accountabilities:

- Performing the role of the Principal Designer and discharging client duties under the CDM regulations
- Performing the role of the Principal Contractor and discharging client duties under the CDM regulations
- Delivery of the preliminary/detailed design
- Construction works.
- Completion of all applicable PCF products
- Monitoring spend to comply with monthly and annual forecast tolerances.
- Assisting the client team with their duties where required

The overall accountability of the project governance sits with the Regional Sponsor. The overall accountability of the project delivery sits with the SRO and Regional Delivery Director.

6.3 Programme / project assurance reviews

Project assurance reviews are held in line with the PCF process and the different assurance process during the project lifecycle are the PCF matrix below:



The following project assurance controls are employed on the Scheme:

- **Regular reporting**, the responsibility of the Project Manager
- **Exception reporting** to capture significant changes in scope, budget or programme.
- **Sign-off of PCF products** as they are produced.
- **Stage Gate Assessment Reviews (SGARs)**, which are planned at the project outset, and which provide basic assurance that the PCF has been followed and the project is ready to proceed to the next stage, subject to investment authorisation.
- **Independent Assurance Reviews (IARs)**, which are peer reviews by independent Project Managers, that confirm that time and cost targets have a realistic basis, lessons are being learned and there is assurance that the project can proceed to the next stage. Following the IAR 3b in September 2023 and as a result of continued delays due to the judicial review, the project is going through another IAR in June 2024.

Investment authorisation is required at the start of each phase in the PCF, once an SGAR and IAR have been held at the end of the preceding stage. SGAR 1 signed off as green. SGAR 2 signed off as green, SGAR 3 signed off as green and Stage 4 Red due to ongoing legal challenge. The project held an SGAR 4 in July 2023 where it received a RED outcome due to an appeal being submitted on the Judicial Review Ruling. All products were signed off as fit for purpose and the project continued with advanced works supported by an interim SGAR 4 with a Green rating. The scheme returned for an SGAR 4 on 29th April 2024, which was passed with an Amber rating, the reason for the amber being again the ongoing judicial review, but deemed a low risk given the successful outcome in the Court of Appeal, with the judges ruling in our favour. On 11th July 2024, the scheme held an interim SGAR 5, which was passed with a Green outcome.

The investment authorisation approves the budget and duration for the project phase, the planned duration for the project as a whole and the outturn range estimate for the project as a whole. The scheme went to IDC and IC in September 2023 and subsequently in July 2024. Link to the IDC approval minutes can be found [HERE](#).

It is the responsibility of National Highways IDC to approve the release of funding for the delivery of the Scheme. The IDC provides effective corporate governance of investment and is used to ensure value for money, effective management control and decision making, and financial and contractual propriety.

6.3.1 Reviews completed before SOBC / OBC / FBC submissions

Projects are evaluated through Stage Gate Assessment Reviews (SGAR) at the end of each PCF stage, in line with National Highways PCF process. Independent OGC reviews of the scheme are also held at intermittent times throughout the project lifecycle, in accordance with the PCF process.

Overview

The Scheme is subject to ongoing reviews throughout its lifecycle as part of the PCF, as summarised in this section and as set out in detail in the PCF Handbook.

Stage Gate Assessment Reviews

SGARs are evidence-driven assessments used to provide basic assurance that:

- The stage is complete and within specified tolerance levels for time and cost.
- The PCF has been followed and the relevant PCF products have been completed to the required standard, with any departures from standard recorded.
- Project Board meetings have been held and plans, risks and issues have been reviewed.
- The project is ready to proceed to the next stage, subject to investment authorisation.
- Lessons learned have been captured for the stage.

Internal assurance review			
Name of review		iSGAR 5	
Date of review	Rating	Summary of recommendations	Response to recommendations
11/07/24	Green	Please see below	Actions now closed

Stage	Stage 5
Author	[Redacted]
Owner	[Redacted]
Product Matrix	v62 - 1st December 2022
Document Number/date issue	V1 - 18/11/19

Approvals		Sign immediately after the SGAR or as soon as is possible	
Sign to approve:			
The outcome of the Stage Gate Assessment Review is agreed as Green This certificate is an accurate reflection of the review. There was 1 formal action to close			
Name	Signature	Date	Role
[Redacted]			Regional Sponsor
Sign to approve:		Sign at later date once actions complete	
All actions in this certificate have been satisfactorily completed.			
Name	Signature	Date	Role
[Redacted]			Regional Sponsor

Internal assurance review			
Name of review		SGAR4	
Date of review	Rating	Summary of recommendations	Response to recommendations
29/04/24	Amber	Please see below	Action now closed

The outcome of the Stage Gate Assessment Review is agreed as AMBER This certificate is an accurate reflection of the review. There was 1 formal action			
Name	Signature	Date	Role
		22/05/2024	Regional Sponsor
Sign to approve: Sign at later date once actions complete All actions in this certificate have been satisfactorily completed.			
Name	Signature	Date	Role
		22/05/2024	Regional Sponsor
Comments This was a Stage End SGAR, ahead of the project proceeding into Stage 5. It was noted in the SGAR that the project is awaiting a Supreme Court decision for an appeal to the DCO decision, which is expected in June/July 2024. This, together with an outstanding product (Supplier Quality plan) resulted in an Amber outcome for the SGAR.			

External assurance review			
Name of review		PAR 2018 November 2018	
Date of review	Rating	Summary of recommendations	Response to recommendations
23/11/18	Amber	The Programme Team should simplify the programme structures by: <ol style="list-style-type: none"> 1. Combining Tuddenham; Blofield and Thickethorne into a single project. 2. Combining Tuddenham to Easton (if a DCO is required) and Wansford 3. Maintaining Great Yarmouth as a separate project. 	I do not agree with this recommendation. Maintaining 6 individual projects gives the most certainty of schedule and the most flexibility for optimisation of the programme. It also will allow DCO submissions to be staggered, if possible, thus smoothing peaks and troughs for the team. However, the Regional Committee, chaired by the Regional Director will need to ratify this decision on 15th September, for which the PL is presenting a paper. 16/11/17 - The corridor approach is now announced which fits with this strategy which was endorsed by the regional committee in September.
		There may be further opportunities to refine the Programme at the end of Stage 2 by handling Great Yarmouth under the Highways Act and Tuddenham to Easton under Highway Authority powers. If this does happen, both of these schemes could be progressed faster, and SoW potentially	The programme team has already aligned to this recommendation by programming a DCO environmental screening for both schemes prior to Dec-17. If they are screened out from the DCO process, then Highways Act and Highway Authority powers can be used.

		commenced earlier than currently planned.	
		<p>The Programme Team should build a single integrated Programme Plan for Stages 3 and 4 for the newly approved Optimised delivery plan. This plan should include all key tasks, milestones, dependencies, critical paths and resources. Continue to use a collaborative approach to building this plan with the suppliers and key internal HE stakeholders in order to develop realistic and robust delivery dates to work to and be held to account.</p>	<p>The corridor approach / optimisation for various HE programmes is still not approved by DfT therefore this specific action is on hold until it is. Currently, the new supplier is working with us to produce detailed schedules for all 6 schemes.</p> <p>16/11/17 - The corridor approach is now announced, and we are working with our lead supplier to develop the overall Programme Plan. This is an overall Strategic plan for the corridor with more detailed project plans underneath that.</p>
		<p>In order to help mitigate substantial programme and commercial risks, the Programme Team should delay the Preferred Route Announcement (PRA) until all key SGAR 2 Products (19, including the Full Traffic and Economic Models and the Environmental Assessments) have been completed.</p>	<p>Now not applicable as PRA was made at risk on the 14th of August following clear instruction by the MP Exec Director.</p>
		<p>The Programme Team should delay the <u>main</u> Stage 3 contract award to consultants (MMS) until the outstanding products critical to PRA have been completed, in order to reduce HE risks and minimise the number of assumptions and exclusions that would have to be included in an early contract.</p>	<p>Main stage 3 task award was deferred and will now be made on 1st October. This has allowed time to clarify the scope following PRA in August.</p> <p>16/11/17 - The main task order for Stage 3 has now been awarded.</p>
		<p>The new Project Sponsor and Programme Leader should urgently clarify the roles, responsibilities, accountabilities, and authorities across the governance structures. In particular, confirm: Sponsor; SRO; Programme Leader; project leads for A47 with clearly articulated separation of duties for each of these roles.</p>	<p>The new Governance roll out is underway with drop-in sessions and presentations to the teams to clarify the structure and responsibilities.</p> <p>16/11/17 - Project and Regional Committees are now also underway which serve to reinforce the roles and responsibilities.</p>
		<p>The RIP Regional Director needs to increase the stability of the membership of the</p>	<p>All team members are now permanent HE staff which will stabilise the recent churn. As a result of a regular review</p>

		Programme Team for the remaining stages of the Programme.	of resource requirements, PL has agreed additional resource to be included in East Region 18/19 and 19/20 resource budget with Regional Director
		The Project Sponsor and Programme Lead should immediately review current Programme Team capacities, capabilities and experience and secure the additional resources to complete the build of the Programme Team resources.	See above, plus PL has introduced a new team structure, a new RASCI chart and is building capability in tandem with wider RIP East initiatives. All team members have undertaken CAT training and completed their CAT assessments which will help their Line Managers tailor their training.
		There is a need to develop a larger Programme stakeholder team including a dedicated Stakeholder Manager for Stage 3 and 4.	<p>Increased resource, dedicated APMs per project and a robust process for incoming correspondence and meetings will negate the need for a dedicated stakeholder manager. This is a key skill PMs and APMs need to learn and perform as part of their role. The new supplier has also built this resource speciality into their offer.</p> <p>However, as we move into a period of at least 4 DCOs next year, the need for a dedicated Stakeholder Manager will be revisited and one of the additional resources which have been budgeted for may be used for that</p>

Name of review		IAR 3a March 2021	
Date of review	Rating	Summary of recommendations	Response to recommendations
9-11 March	Amber	Lay out a clear definition of roles and responsibilities across the project leadership, team, operations, new supplier and business partners.	Organogram in place for the A47 teams
		The new Project Team should continue to receive support, mentoring and training from the senior management and business partners.	Programme leader providing guidance and support as required along with Project Sponsor. Training has been and continues to be carried out using the learning portal to bridge skills gaps.
		Review the existing delivery plan with the delivery partner and re-baseline the timeline.	The clause 31 programme has been submitted and accepted following a review of the timeline with the delivery partner.

		Develop a communications plan to help the Project Team re-build relationships with internal and external stakeholders especially the A47 Alliance and the 23 parish councils and prepare them for the way forward. This should not be left until the new delivery integration partner is fully on-board, but that work should start now.	A communications plan was developed, and engagement is upheld with internal and external stakeholders. Records or meetings are logged, and dates of meetings stored on the project Communications plan.
		Clear leadership on stakeholder management should come from within the Project Team and not left to the supplier or business support team. Feedback from meetings should be recorded and shared with the Project Team.	Meetings have been held with key stakeholder groups, including Norwich Western Link, the Food Enterprise Park and meetings with Norfolk County Council and are logged on the Project Communications Plan

Name of review		PAR 3b June 2022	
Date of review	Rating	Summary of recommendations	Response to recommendations
15-06-22	Amber	The Project Team to provide hard evidence to the SRO that this figure has been used in the latest IDC paper and must be clarified.	Completed
		The Project Team should work with the suppliers to ensure they provide specific dedicated resources for the project.	Ongoing – Updated resource plan from GT (Galliford Try) shared with team 04/10 See provided Supplier Organogram for detail, dedicated SPM (Senior Project Manager), x2 PM (Project Managers), Site agent, Planner, QS (Quantity Surveyor), Stakeholder Lead in role
		The Senior Management Team needs to investigate the capability and capacity of the Project Team to ensure they have the right skill sets and staff available to manage the project.	Ongoing – New PM (Project Managers) joining team from 1 st Nov
		If possible, the Project Team should re-run the traffic modelling with latest data, scope, and costs available from the project or at the very least, to substantiate the latest data with sensitivity tests.	Ongoing - Traffic products being updated for Stage 4. This is completed, TFP (Transport Forecast Package), TDP (Transport Data Package), EAP (Economic Appraisal Package) approved. Traffic Transport covered at DCO ISH 4 NOV

		The SRO should consider temporarily delaying the submission to ensure concerns are addressed.	Completed - DCO accepted with no comments
		The Project Team to maintain focus and consider a dedicated resource in the short term to focus on stakeholder engagement.	Ongoing – Dedicated Stakeholder resources implemented by GT.

Name of review		IAR 3b September 2023	
Date of review	Rating	Summary of recommendations	Response to recommendations
06-09-23	Amber	The SRO to ensure an up to date start of works strategy is in place and share with the IPT and stakeholders where necessary.	The SoW strategy is in place and is being managed through the Collaborative Planning workstream. There is a SoW Checklist that was shared with the IPT by the Sponsor and this structures the work that the IPT is carrying out to ensure all necessary steps are being taken to achieve SoW as planned.
		SRO should ensure there is an accepted programme in place.	In progress. 09/01/24 The latest CI32 Programme was rejected on the basis that it doesn't comply with the Scope (cost loading is not complete and the full impact of the appeal delay is not appropriately captured, as no mitigation is included). 12/04/24 The programme continues to be rejected on the basis that it is not realistic and in accordance with the Scope. GT are reluctant to show a SoW in August 24 without a clear instruction from the Client to commence the works then, so the Programme still shows the 12 months delay due to the JR, with a SoW in January 25. 15/05/2024 An instruction was issued for the advanced works to be undertaken in summer/autumn of 2024. The CI32 Programme will now show a SoW in accordance with this.
		The SRO to ensure that the BREP is in place.	In progress. 09/01/24 A BREP is now in place, but due to the ongoing delay as a result of the appeal, it will be finalised in the new year, once economics are refreshed and the B&VM team amend

			<p>the document as necessary. The document is in line with the Value Management Delivery Plan, which was reviewed and approved in November 2023.</p> <p>15/05/24 The sensitivity tests are nearly complete and the results will be included in the ComMA as an appendix (as agreed). When this is done, the BREP that was started before the Court of Appeal hearing can be revisited and signed off accordingly.</p>
		<p>SRO to ensure the continued engagement with Operations and local authority during the construction phase.</p>	<p>14/12/23 Agree with the recommendation and the IPT would like to give assurance that engagement with OD and local authority is regular and ongoing. This is considered BaU.</p> <p>Also, before construction begins, the IPT plans to organise a workshop with OD, asset owner, Senior User and other colleagues to run through the design and construction phasing and ensure that everyone is aware of the works. This contributes towards a smooth handover when the scheme finishes construction and OD colleagues will be taking over.</p>

Name of review		IAR 3b June 2024	
Date of review	Rating	Summary of recommendations	Response to recommendations
25-27-2024	Red	<p>The DSRO and Project Team need to ensure the FBC is updated and approved</p>	<p>Work was underway at the time of the review. The FBC is the final document produced once the assessment is complete and the preconstruction estimate is produced. The document was shared with the review team, but it wasn't signed off as per the PCF framework, as this process is lengthy and requires a long consultation process. Nevertheless, the BC was final and complete and the time of the review.</p>
		<p>The DSRO and the project team need to liaise with the NH Chief Analysts office who provide this evidence to support the FBC.</p> <ul style="list-style-type: none"> Received by the project team on 28/06/2024. 	<p>Both the VfM and the AAS were shared with the review team on 28th June 2024.</p>

		The DSRO and the project team should ensure that the Total of the costs/confirmed DIP budget is confirmed and agreed to enable the project to commence SoW.	The team is on track to achieve this by the end of August 2024, as planned.
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Name of review		IAR 3B Assurance Action Plan
Date of review	Rating	Summary of recommendations
July 2024	Amber	It re-assessed the Delivery Confidence Assessment in the light of actions taken since the IAR 3b June. As a result of the action taken since the independent assurance review the delivery confidence has improved from RED to AMBER

All actions relating to previous Assurance reviews are being monitored through the Committee.

6.3.2 Review relating to this business case stage

Independent Assurance Reviews

It is a requirement of the PCF that Independent Assurance Reviews (IARs) are carried out, where independent project managers from within National Highways examine the progress and likelihood of successful delivery of the project.

IARs will be carried out at the end of PCF Stages 2, 3, 5, 6 and 7, following the SGAR held at the end of each stage. IAR 3b was held between 4th and 6th September 2023 and the actions are captured above in Section 6.3.1. A Risk Potential Assessment (RPA) was done prior to the IAR, in June 2023, and it scored low on the overall complexity matrix. The RPA can be found [HERE](#).

Operations Technical Leadership Group

The operational solution will be presented to the Operations Technical Leadership Group (TLG) to facilitate the sharing of best practice across projects, with a focus on operational, safety and maintenance issues. The Stage 3 Ops TLG took place on 10th December 2020 and Stage 5 Ops TLG took place on 14 September 2022, as Stages 4 and 5 were ran concurrently as explained in section 1 of this Business Case. This will take place again in PCF Stages 7.

Investment Authorisation

The ultimate decision to continue to invest in the continued development of the Scheme is the responsibility of National Highways IDC. Investment authorisation is required from the IDC.

6.3.3 Project evaluation reviews

Project evaluation reviews are planned at 1 and 3-year intervals, commencing at the opening of the scheme to traffic. The evaluation is in the form of the Post Opening Project Evaluation (POPE). Following OfT, which is scheduled for April 2027, we will undertake an evaluation to see whether the scheme has had the benefits and impact predicted. The evaluation will focus on issues relevant to the individual scheme and published key objectives.

6.3.4 Post implementation review

The regular review process will continue throughout construction and post implementation, using the Benefits Realisation and Evaluation Plan Share Link Stage 5. The SRO will commission a formal Post Implementation Review (PIR) prior to the IAR at PCF Stage 7 before the handover to operations and before the end of the defects period. The PIR will help to identify the performance of the scheme against the objectives set, examine the final outturn costs in comparison to the cost estimates and identify lessons learnt. The SRO will also be responsible for disseminating the outputs of the PIR to the appropriate stakeholders.

6.3.5 Post project review

A post project review will take place following PCF Stage 7 Closeout. The focus of this review will be on how the benefits information and lessons learnt can be applied to future projects.

6.3.6 Lessons learned

Lessons learnt from previous projects have been considered in the development of the project. The PCF product Lessons Learnt Log will added when approved AUG 23 – see current link Stages 4 & 5 Lessons Learnt Log 06-07-23 documents the sharing of best practice. The Lessons Learnt workshops for PCF Stage 3, and combined 4 and 5 have been completed.

6.4 Contingencies and dependencies

Contingency Plan

In line with the PCF, the Scheme is being delivered in stages. If at any stage it was deemed undeliverable, it would be closed down and all data passed to National Highways. Reasons for this may include:

- Affordability
- Legislation
- Outside facts (Environmental constraints)
- Buildability

Many of the risks associated with these scenarios have been recorded in the project risk register with appropriate mitigation noted. Should any risks be realised the team will ensure the project communications plan is updated, the National Highways Press Office engaged, and a mitigation plan put in place to ensure the key messages are communicated.

In the event that this scheme fails the other projects within the A47 Corridor Programme would be able to continue and the project would then be reviewed as part of the National Highways RIS3 programme (2025 – 2030).

6.4.1 Dependencies

In developing the scheme further, a comprehensive risk log will be maintained as part of the Management Case. The delivery of the A47 North Tuddenham to Easton Scheme will be dependent on these risks either not arising or being mitigated so that the scheme delivery is not affected.

At this stage a number of key potential issues and factors that might influence the successful delivery of the scheme have been identified.

Internal

- Cost changes due to optimisation
- Statutory processes: the time and cost to acquire the land required to implement the scheme.
- Acceptance; potential opposition and challenges to the scheme.

External

- Strategic issues, such as changes in Government priorities and/or lack of support from local authorities.

Table 8: Summary of Project Dependencies

	Yes	No	n/a	Comment
Is entry available to all land or property for the project?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Access has been agreed for surveys and ecological works. Access for all main works is in progress at stage 5
Have all the Highways Act and land orders and agreements been made?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	In progress at stage 5
When does the high court challenge period expire?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	June 2023
Have all technical approvals be given? If not, why not?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	In progress at stage 5
Have all Road Traffic Regulation Orders been made? If not, why not?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	In progress at stage 5
Do you have landlord's agreement for the required changes?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	In progress at stage 5
Do you have planning permission for the required changes?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	In progress at stage 5

6.5 Findings and conclusions

The programme and project management section has summarised the overall approach to project management at FBC stage of the project. This is expected to provide robust governance and assurance of project outcomes going forward.

The project is being delivered using best practice National Highways management processes as set out in the Stage 5 Project Management Plan. There are clearly defined project plans, governance structure, risk management, communications and stakeholder management and assurance processes.

Key points are:

- The project governance structure is in place (Section 6.2 Programme/project management plan (PMP) and assessment).
- The Communication Plan has been submitted for review.
- Project reporting is done through Power BI, Oracle and, MP Drive and Chrysalis systems. The Programme Management Office is coordinating monthly reports (Section 6.2 PMP and assessment).
- Change management is undertaken using CEMAR, an online Contract Event Management and Reporting tool. The Project Manager has responsibility for the process and the Project Committee has the authority for approval (Section 6.1 Management arrangements).
- A risk management process is in place, with a risk database in Xactium (Section 6.1 Management arrangements).
- Lessons learnt from the current stage and previous stages have been captured (Section 6.3 Programme/project reviews).

It is recommended that the scheme continue to Constructio

