West Northamptonshire Council

A422 FARTHINGHOE

Strategic Outline Case

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West Northamptonshire Council

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1 INTRODUCTION

1.1 PURPOSE OF THE REPORT

1.1.1. This Strategic Outline Case (SOC) report sets out the rationale for intervention (the case for change) and confirms how the investment will further the organisation's priorities and wider government ambitions (the strategic fit) to determine the 'preferred way forward'.

1.1.2. The report has been developed in line with TAG and it considers:

- The strategic context – identify how the transport proposal will contribute to achieving objectives at the national, regional and local scale and the strategic priorities of the organisation. Explore how it aligns to other existing and planned transport policies
- Consider place-specific implications – where relevant, determine how the transport proposal will fit with regional and local priorities of the area(s) in scope. Assess how the proposal will complement existing and planned initiatives (including non-transport policies and consider the impact it may have on different social groups
- Identify the problem – outline the issue(s) to be solved
- Establish whether there is a need for a transport intervention – define the specific role that the transport proposal will play when delivered and confirm that a transport policy is the best option to solve the problem(s) identified

1.2 BACKGROUND

1.2.1. Farthinghoe is located on the A422 south-east of Banbury and north-west of Brackley. It is the main route between these two urban areas and the junction 11 of the M40 motorway located just outside Banbury. The location of Farthinghoe is shown in Figure 1-1.

Figure 1-1 - Farthinghoe Location

1.2.2. Farthinghoe Parish Council has long campaigned for a bypass of the village and problems cited include the following: -

- Volume of traffic through the village
- Unsuitability of the carriageway for HGV use
- Accident black spot at Glebe Farm
- Poor geometry of the route

FEASIBILITY STUDY (2015)

1.2.3. In 2015 NCC commissioned Northamptonshire Highways to undertake a feasibility study of potential route options for a bypass of Farthinghoe village. The resulting Feasibility Report titled "A422 Farthinghoe Bypass - A Review of Previous Options and An Appraisal of Current Options" (dated 02 September 2015) considered 3 routes which had prepared following Public Consultations in 1989 and 1991. The 3 Routes considered in this report were: -

- Route 1/2015 Southern Bypass
- Route 2/2015 Northern Bypass
- Route 3/2015 Southern Bypass

1.2.4. The Report recommended the following "Favoured Options":-

- Route 2 2015- a 1.85km S2 standard road designed to 100kph design speed to the north of Farthinghoe
- Route 3 2015 - a 1.83km S2 standard road designed to 85kph design speed to the south of Farthinghoe.

PUBLIC CONSULTATION (2015)

1.2.5. On 4th and 5th December 2015 a Public Exhibition was held in Farthinghoe Village Hall. The purpose of the Public Exhibition was for Northamptonshire County Council to seek the views of Farthinghoe Village Residents, and other members of the public in the locality, on whether the A422 Principal Road through Farthinghoe Village should be bypassed, and if so, whether the preference was for a Northern Bypass or a Southern Bypass. Two routes were shown at the Public Exhibition and as part of a wider consultation exercise that included the distribution of leaflets. Information was also set up on the Northamptonshire County Council's web site.

1.2.6. Northamptonshire Highways prepared a report titled "A422 Farthinghoe Bypass - Public Consultation" (dated 28 January 2016) which reported on the consultation exercise and summarised that: -

- In total, 78% of Farthinghoe village residents supported a bypass. With the inclusion of non-residents, a total of 76% of overall respondents support a bypass.
- Of the 77% of Farthinghoe residents who expressed a preference on route location, 74% opted for the northern route and 26% opted for the southern route.
- When Farthinghoe residents were asked whether they would support a bypass, irrespective of the selected option, 57% stated they would with 43% stating they would not.

1.2.7. Concerns that were raised at the consultation included: -

- That both options under consideration were too close to the village. Consequently, options should be considered that relocated routes further away from the village.
- The adverse impact the northern route would have on the 'Yurt Business', 'medieval ponds' and the 'special landscape'. These important factors would need to be investigated further.

1.2.8. A report was submitted to NCC Cabinet on 9th November 2016 which resolved that Cabinet:

- Agreed that the A422 Farthinghoe Bypass is added to the County Council's priority list of major road schemes.
- Noted the preference of the public consultation for a northern route and agreed that this should form the basis of further work to develop the scheme.

FURTHER DEVELOPMENT OF THE ROUTE

1.2.9. In August 2019 Northamptonshire County Council (NCC) instructed Northamptonshire Highways to carry out a further review for the Farthinghoe Bypass Northern Route (Route 2 2015) as follows: -

- Carry out preliminary design work, investigation and production of a technical report for the A422 Farthinghoe Bypass. The results of the 2015 consultation as well as previous work undertaken should inform the next stages of the design and investigation.
- This work will identify through the use of desk top studies as far as practicable any likely environmental, heritage and engineering constraints to produce a horizontal and vertical alignment and junction layouts for the northern corridor option which provide the optimum solution in terms of buildability, benefits and cost.

- A supporting technical report covering the engineering, environmental and traffic assessments and provide recommendations on programme and costs for taking the scheme forward through planning to delivery on site.

1.2.10. During the initial review of the history of the project several concerns and constraints were identified which could result in risks to the delivery of the single route assessment. In particular the 2015 response by Heritage England in which they raised concerns about the proximity of Route 2 2015 to heritage assets and subsequent impact upon their settings as follows: -

"There is the potential for the proposed Northern Bypass to have a harmful impact upon the setting of the highly graded Church of St Michael and Abbey Lodge, together with other heritage assets, emphasised further by the five-metre-high bund. The Southern Bypass, proposed to have a 12 metre high embankment, has the potential for harm to the Conservation Area, which it would directly abut and other heritage assets, together with the Scheduled Monument and surrounding medieval landscape".

"Should a scheme be taken forward, in line with the advice in the National Planning Policy Framework (NPPF), we would expect the EIA documentation to contain a thorough assessment of the likely effects which development might have upon those elements which contribute to the significance of any heritage asset that may be affected by development on the proposed site. In this way it should be possible to identify (and where possible avoid, minimise or if appropriate mitigate) direct and indirect impacts on assets of local, regional and national importance."

1.2.11. The risks identified include: -

- Likely that there could be significant impacts upon the setting of the listed buildings
- Insufficient evidence is available for the decision to produce a bypass out of all transport options available
- Insufficient evidence is available, to justify why the bypass should be located to the north of Farthinghoe and not to the south where fewer listed buildings are present
- Need to be able to show the scheme is unlikely to be locked by any physical or legal impediments

2 STRATEGIC CASE/DIMENSION

2.1 INTRODUCTION

2.1.1. This strategic dimension describes how the transport proposal contributes to achieving strategic priorities and how it aligns with existing portfolios, programmes and projects in DfT, across government and in the geographical area of scope.

2.1.2. It's aim is to make a compelling, evidence-based case to establish whether a transport intervention is needed either now or in the future.

2.1.3. The strategic dimension consists of:

- The strategic context – considering the wider social and economic context, using evidence, to demonstrate how the transport proposal fits with the strategic priorities of the organisation, wider government ambitions and local and regional strategies. Describe how the investment interacts with planned and existing strategic portfolios, programmes and projects of the organisation and in the geographical area of scope
- The case for change – outline the current situation, identify a clear rationale for the transport intervention and provide a logical, objectively supported and evidence-based process of change to determine how the SMART spending objectives will be achieved

2.2 ORGANISATION OVERVIEW

2.2.1. There are several strategic priorities identified in the proposal, including promoting active travel, ease congestion, improve the safety of the A422, improve the air quality in the Farthinghoe Village and the vicinity and preserve the designated Conservation Area within the Farthinghoe Village.

2.2.2. The responsible organisations for various strategic priorities are listed in Table 2-1.

Table 2-1 Strategic priorities and responsible organisations

Strategic priorities	Responsible organisation
▪ Active Travel	▪ West Northamptonshire County Council
▪ Congestion relief	▪ Department for Transport (DfT) ▪ West Northamptonshire County Council ▪ National Highways
▪ Improve safety	▪ Department for Transport (DfT) ▪ West Northamptonshire County Council
▪ Improve air quality	▪ Department for Transport (DfT) ▪ West Northamptonshire County Council
▪ Preserving the designated Conservation Area	▪ Natural England

2.3 BUSINESS STRATEGY AND WIDER STRATEGIES/STRATEGIC CONTEXT

2.3.1. This section highlights the strategic fit of the Farthinghoe scheme with regards to national, regional and local transport policy and the corresponding objectives. This session demonstrates how the Farthinghoe scheme aligns with a range of existing strategies and plans. The relevant documents with infrastructure objectives are set out by their national, regional and local coverage.

- National Policy
  - The Growth Plan (2022)
  - National Planning Policy Framework (2021)
  - National Highways Net Zero Highways Plan (2021)
  - National Infrastructure Strategy (2020)
  - Transport Decarbonisation Plan (2021)
- Regional Development Schemes
  - England's Economic Heartland Freight Study (2019)
  - South East Midlands Strategic Economic Plan (2017)
  - South East Midlands Transport Strategy (2014)
  - Northamptonshire Transportation Plan (2012)
- Local Development Plans
  - The West Northamptonshire Strategic Plan
  - West Northamptonshire Joint Core Strategy Local Plan (adopted in 2014)
  - South Northamptonshire Part 2 Local Plan (2011-2029)
  - Northamptonshire Transport Plan (2012)

NATIONAL POLICY

The Growth Plan (September 2022)

2.3.2. The Growth Plan was produced in September 2022 and makes growth the government's central economic mission, setting a target of reaching a 2.5% growth trend rate. The Growth Plan seeks to drive higher growth, unlock private investment across the UK and cut red tape to make it quicker to deliver the UK's critical infrastructure. The Plan sets out that boosting productivity growth and labour supply is vital to increasing economic growth, which would then support the improvement of living standards.

The National Planning Policy (2021)

2.3.3. Table 2-2 summarises the NPPF sustainable development objectives and sections of the NPPF that are relevant to the Farthinghoe scheme.

Table 2-2 - NPPF sustainable development objectives and sections relevant to the scheme

Objective / Section	Summary of objectives / relevant sections	Strategic fit
An Economic Objective	To help build a strong, responsive, and competitive economy, by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity; and	The bypass will support the local economy and provide a strategic advantage for the wider region. It will support local growth through

Objective / Section	Summary of objectives / relevant sections	Strategic fit
	by identifying and coordinating the provision of infrastructure.	increasing attractiveness to local business by reducing congestion and increasing accessibility.
A Social Objective	To support strong, vibrant and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations; and by fostering well-designed, beautiful and safe places, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being.	The bypass will support communities though reducing congestion within the village, contributing to improving air quality in Farthinghoe, as well as supporting new housing developments locally.
Promoting healthy and safe communities	Planning policies and decisions should aim to achieve healthy, inclusive and safe places which: promote social interaction; are safe and accessible; and enable and support healthy lifestyles.	The bypass will reduce congestion on the nearby A422, reducing air and noise pollution to nearby residents. The new bypass also provides opportunities for lowering local traffic speeds through the village and improving quality of place.
Promoting sustainable transport	Applications for development should: ▪ Give priority first to pedestrian and cycle movements and second, so far as possible – to facilitating access to high quality public transport ▪ Address the needs of people with disabilities and reduced mobility in relation to all modes of transport ▪ Create places that are safe, secure and attractive – which minimise the scope for conflicts between pedestrians, cyclists and vehicles, avoid unnecessary street clutter, and respond to local character and design standards ▪ Allow for the efficient delivery of goods, and access by service and emergency vehicles ▪ Be designed to enable charging of plug-in and other ultra-low emission vehicles in safe, accessible and convenient locations.	The bypass will aid a reduction in congestion, allowing for the efficient delivery of goods and access by service and emergency vehicles. The modern, fit-for-purpose road will improve safety for non-motorised users and the resultant lowering of traffic in nearby residential areas will aid in encouraging active travel.
Achieving well-designed places	Planning policies and decisions should ensure that developments: ▪ Will function well and add to the overall quality of the area, not just for the short term but over the lifetime of the development ▪ Are visually attractive as a result of good architecture, layout and appropriate and effective landscaping ▪ Are sympathetic to local character and history, including the surrounding built environment and landscape setting, while not preventing or discouraging appropriate innovation or change ▪ Establish or maintain strong sense of place ▪ Optimise the potential of the site to accommodate and sustain an appropriate amount and mix of development and support local facilities and transport networks ▪ Create places that are safe, inclusive and accessible and which promote health and well-being.	The bypass will reduce congestion on nearby roads, reducing noise and air pollution in nearby residential areas. The removal of this traffic through the village also allows for lower traffic speeds in residential areas, creating safer places for residents and non-motorised users.

National Highways Net Zero Highways Plan (2021)

2.3.4. The Net Zero Highways Plan is an ambitious programme which seeks to put roads at the heart of Britain's net zero future. The plan sets out that roads will be a vital part of net zero carbon travel as most journeys are made by road; there is more to do to decarbonise road travel; a net zero Britain will still travel by road; and investment in Britain's roads supports a thriving net zero economy.

2.3.5. The Net Zero Highways Plan aligns with the 1.5-degree Celsius reduction goal of the Paris Agreement; the UK's commitment to be a net zero economy by 2050; the Decarbonising Transport document (2021); and the Committee on Climate Change's sixth carbon budget.

2.3.6. The Plan sets out that road travel provides a convenient, low cost and practical way to travel; with almost nine out of ten passenger miles travelled by road.

2.3.7. The Plan's commitments are backed by immediate and sustained action:

- Corporate emissions net zero by 2030
- Maintenance and construction emissions net zero by 2040
- Road user emissions net zero by 2050

2.3.8. Table 2-3 provides further detail on these three strong commitments.

Table 2-3 - Net Zero Highways Commitments

Commitment	Summary of commitments	Strategic fit
Road user emissions net zero by 2050	▪ Proposed approach to zero carbon HGV trials by end of 2022. ▪ Blueprint for EV charging services by 2023. ▪ Integrate a strong modal shift programme in Road Period 3.	The Farthinghoe bypass will improve the air quality for local residents and reduce noise pollution from through traffic. However, carbon emissions will continue to be produced by road traffic using the bypass, albeit at a more efficient level due to reduced congestion.

National Infrastructure Strategy (November 2020)

2.3.9. The National Infrastructure Strategy outlines plans to transform the UK's infrastructure networks. It is based around four overarching subject matters:

- **Levelling up** – boosting growth and productivity by investing in rural areas, towns and cities through major national projects or local priorities
- **Carbon Net Zero emissions by 2050** – to put the UK on path to meeting its net zero emissions target by transforming infrastructure to decarbonise the UK's power, heat and transport networks
- **Supportive private investment** – to attract private investment into infrastructure, by providing clarity on government plans to increase certainty for investors, so they can help deliver the upgrades and projects needed across the country
- **Accelerate and improve delivery of infrastructure projects** – reforming and speeding up the planning system, and improving the way projects are chosen, procured and delivered

2.3.10. The National Infrastructure Strategy shares the National Infrastructure Commission's ambitions for Levelling Up towns and cities outside of London. It sets out that infrastructure, including transport,

underpins the economy as they are vital for jobs, businesses and economic growth; as such, the government wants to deliver an infrastructure revolution to radically improve the UK's infrastructure.

2.3.11. The Strategy sets out the government's plans to deliver this ambition, through two key ambitious plans set out in Table 2-4

Table 2-4 - National Infrastructure Strategy plans to meet ambitions

Plans	Summary of plans	Strategic fit
Decarbonising the economy and adapting to climate change	▪ Accelerate deployment of existing technology whilst advancing newer technologies to help deliver net zero emissions ▪ Investment in offshore wind, nuclear, carbon capture and hydrogen ▪ Investing in charging infrastructure to accelerate mass adoption of electric vehicles	The Farthinghoe bypass will improve the air quality for local residents and reduce noise pollution from through traffic. However, carbon emissions will continue to be produced by road traffic using the bypass, albeit at a more efficient level due to reduced congestion.
Accelerating and improving delivery	▪ The government wants to deliver infrastructure projects better, greener and faster ▪ Addressing complex planning decisions, slow decision making and slow productivity in the construction sector ▪ Embedding good design in all infrastructure projects	The bypass will provide additional highway capacity to support the reduction of congestion through Farthinghoe on the existing A422, improve resilience of the network and decrease journey times for through traffic.

REGIONAL STRATEGIES AND PLANS

England's Economic Heartland Regional Transport Strategy (February 2021)

2.3.12. England's Economic Heartland Transport Strategy sets out that EEH and partners have a unique opportunity to transform the region's transport system. The EEH outlines that its transport system has a key role to play in enabling the region's economic potential to be realised.

2.3.13. The Transport Strategy is ambitious, it sets out a policy framework designed to harness the region's inherent strengths to deliver a vision for its transport system, including to support sustainable growth and improve quality of life. Table 2-5 identifies the plan of action set out in the EEH transport strategy.

Table 2-5 - EEH Transport Strategy plan of action

Summary of plan of action	Strategic fit
Champion increased investment in active travel and shared transport to improve local connectivity to ensure that everyone can realise their potential.	The bypass would support connections in the area, opening up the existing alignment through Farthinghoe to active modes – delivering improved routes for non-motorised users.
Continue to ensure the needs of the freight and logistics sector are met whilst lowering its environmental impact.	Supporting connectivity is particularly relevant to the local logistics and distribution industry, building on local strengths and opportunities.

England's Economic Heartland Freight Study (June 2019)

2.3.14. The EEH Freight Study is a major study into freight and logistics which has identified a number of priorities for the region, including improving strategic road access, maximising the use of rail freight, and encouraging investment in greener technology.

2.3.15. The study provides an assessment of the region's freight needs and the implications of future demands and trends up to 2050. The EEH freight study will act as a core component of, and also feed into, the overall transport strategy for the region.

2.3.16. Table 2-6 summarises the issues and road freight opportunities in the region, as identified in the EEH Freight Study.

Table 2-6 - EEH Freight Study issues and strategic opportunities

Issues and opportunities	Summary of road freight issues and opportunities	Strategic fit
Alternative fuels	Improve air quality and reduce GHG emissions across the region, while making the region more attractive to businesses and supporting innovation in vehicle and infrastructure.	The Farthinghoe Bypass will improve the air quality for residents and reduce noise pollution from through traffic. However, carbon emissions will continue to be produced by road traffic using the bypass, albeit at a more efficient level due to reduced congestion.
Safety	Reduce the number of collisions and injuries involving HGVs.	The modern bypass will improve safety both on the new bypass and on surrounding roads, by reducing traffic (particularly HGVs) on residential roads.

South East Midlands Strategic Economic Plan (November 2017)

2.3.17. The mission of the South East Midlands Local Enterprise Partnership's (SEMLEP) Strategic Economic Plan (SEP) is to build on the area's reputation as a premier location for growth, innovation, creativity and world-leading technologies; with the aim to double GVA by 2050.

2.3.18. The plan sets out the ambition and strategic economic direction for the South East Midlands to 2050, focusing particularly on the next 10 years. The SEP provides detailed economic evidence that underpins long-term strategic priorities.

Northamptonshire Transportation Plan (March 2012)

2.3.19. The Northamptonshire Transportation Plan (NTP) is the Local Transport Plan (LTP) for the County. The overall aim of the NTP is 'Fit for Purpose' which means creating a transport network that delivers exactly what the County needs to be able to function and grow.

2.3.20. The plan reflects the changing nature of Northamptonshire, reflecting new ways of thinking, not only in regard to transport, but also lifestyles and how people go about their daily lives. It looks to find new ways of working to ensure that the County delivers best value for money to residents and council tax partners. Table 2-7 summarises the key objectives from the NTP.

Table 2-7 - Summary of NTP objectives

Objective	Summary of objectives	Strategic fit
Fit for… the Future	Creating a transport system that supports and encourages growth and plans for the future	The bypass will provide a modern link, improving safety and accessibility in the area. It also aids in

Objective	Summary of objectives	Strategic fit
	impacts of growth, whilst successfully providing for the county.	facilitating growth by reducing congestion and improving journey time reliability.
Fit for… the Community	Through the transport system help maintain and create safe, successful, strong, cohesive and sustainable communities where people are actively involved in shaping the places where they live.	The bypass will improve safety through a reduction in congestion and waiting at junctions. The reduction in congestion will improve journey times and the reduction in traffic on nearby roads will encourage active travel and encourage sustainable local travel.

LOCAL STRATEGIES AND PLANS

West Northamptonshire Joint Core Strategy Local Plan (July 2016)

2.3.21. The West Northamptonshire Joint Core Strategy Local Plan sets out long term vision and objectives for the whole of the West Northamptonshire area covering the Daventry District, Northampton Borough and South Northamptonshire Councils.

2.3.22. The plan identifies specific locations for new strategic housing and employment and changes to transport infrastructure and other relevant community facilities. The key objectives of the West Northamptonshire Joint Core Strategy Local Plan are shown in the following table.

Table 2-8 Summary of WNJCSLP objectives

Objective	Summary of objectives	Strategic fit
Infrastructure and Development	To protect and enhance existing local services and to ensure social, physical and green infrastructure is provided to meet the needs of people and business within the area.	The Farthinghoe bypass will enhance the safety of the area and preserve the historical environment.

South Northamptonshire Part 2 Local Plan (2011-2029)

2.3.23. The South Northamptonshire Part 2 Local Plan (2011-2029) builds on the policies of the adopted West Northamptonshire Joint Core Strategy (WNJCS) and includes area identified within the WNJCS. It is expected to meet the needs of the region up to 2029.

2.3.24. The Local Plan has set out 10 objectives to enhance the development of the area. These objectives serve to remain the existing balanced and sustainable communities. All development is required to take place in a sustainable manner. The key objectives of the South Northamptonshire Part 2 Local Plan are.

Table 2-9 Summary of South Northamptonshire Part 2 Local Plan objectives

Objective	Summary of objectives	Strategic fit
Vision and objective 7	To work with partners to ensure that new development is supported by the necessary provision of infrastructure to support the health and well-being of sustainable community	The Farthinghoe bypass will support the development of the community by providing sufficient infrastructure.

2.4 EVIDENCE OF NEED

BACKGROUND

2.4.1. Farthinghoe is an attractive West Northampton village situated on a key link (A422) between Brackley and Banbury. The A422 is part of the Major Road Network (MRN) and the most recent count data shows that circa 34,000 vehicles use the route on an average weekday. Farthinghoe is well located near the Strategic Road Network (SRN) including the M40 and the A43.

2.4.2. The scheme focuses on the development of a new offline bypass with the provision of two new junctions connecting the bypass to the existing road network. The proposed junctions would be located approximately 1km west and 1 km east of Farthinghoe, the current A422 road will remain in place.

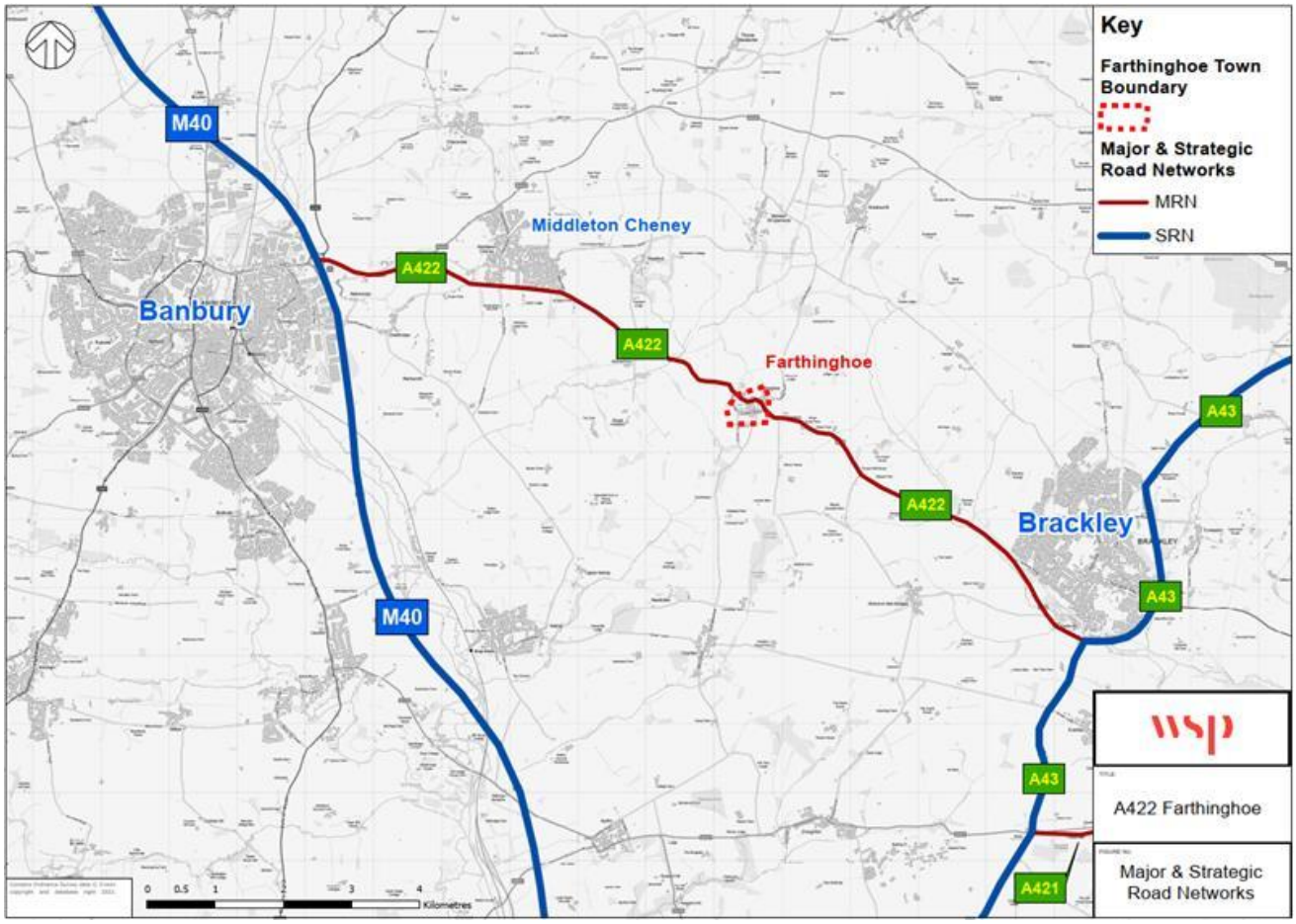


Figure 2-1 - MRN and SRN network

NETWORK OVERVIEW

2.4.3. The Strategic Road Network (SRN) surrounding Farthinghoe provides key regional and national access to wider economic areas, as well as links for international connectivity. The following SRN links are all located in close strategic proximity to Farthinghoe, Northamptonshire:

- **The A43** connects Northamptonshire to the M40, A5 and M1, it is a vital north east-south west link in Northamptonshire, connecting areas such as Northampton, Kettering and Corby; as well as connecting Northamptonshire to Milton Keynes and Birmingham

- **The M40** connects Northamptonshire to London and Birmingham
- **The M1** connects Northamptonshire to London, Leicester, Nottingham and the M45
- **The A5** connects Northamptonshire to Daventry International Rail Freight Terminal (DIRFT), Milton Keynes and the West Midlands

Northamptonshire benefits from being located within the 'golden triangle', which is an area renowned for having freight and distribution centres. Logistics companies can access 90% of the UK population within a four-hour drive of the golden triangle, which makes it an ideal location for freight hubs. This is evidenced by the planned growth in distribution centres in the locality, such as the proposed Northampton Gateway Strategic Rail Freight Interchange (SRFI), which was granted planning approval by the Secretary of State in October 2019 as a Nationally Significant Infrastructure Project. The Northampton Gateway SRFI will provide over 5 million square foot of logistics space and will provide major improvements to the M1 Junction 15 to accommodate the traffic growth. Construction began in June 2021 to create the connection for the SRFI at Northampton Gateway. Figure 2-2 shows the wider context of Farthinghoe and the A422 in relation to the SRN connections.

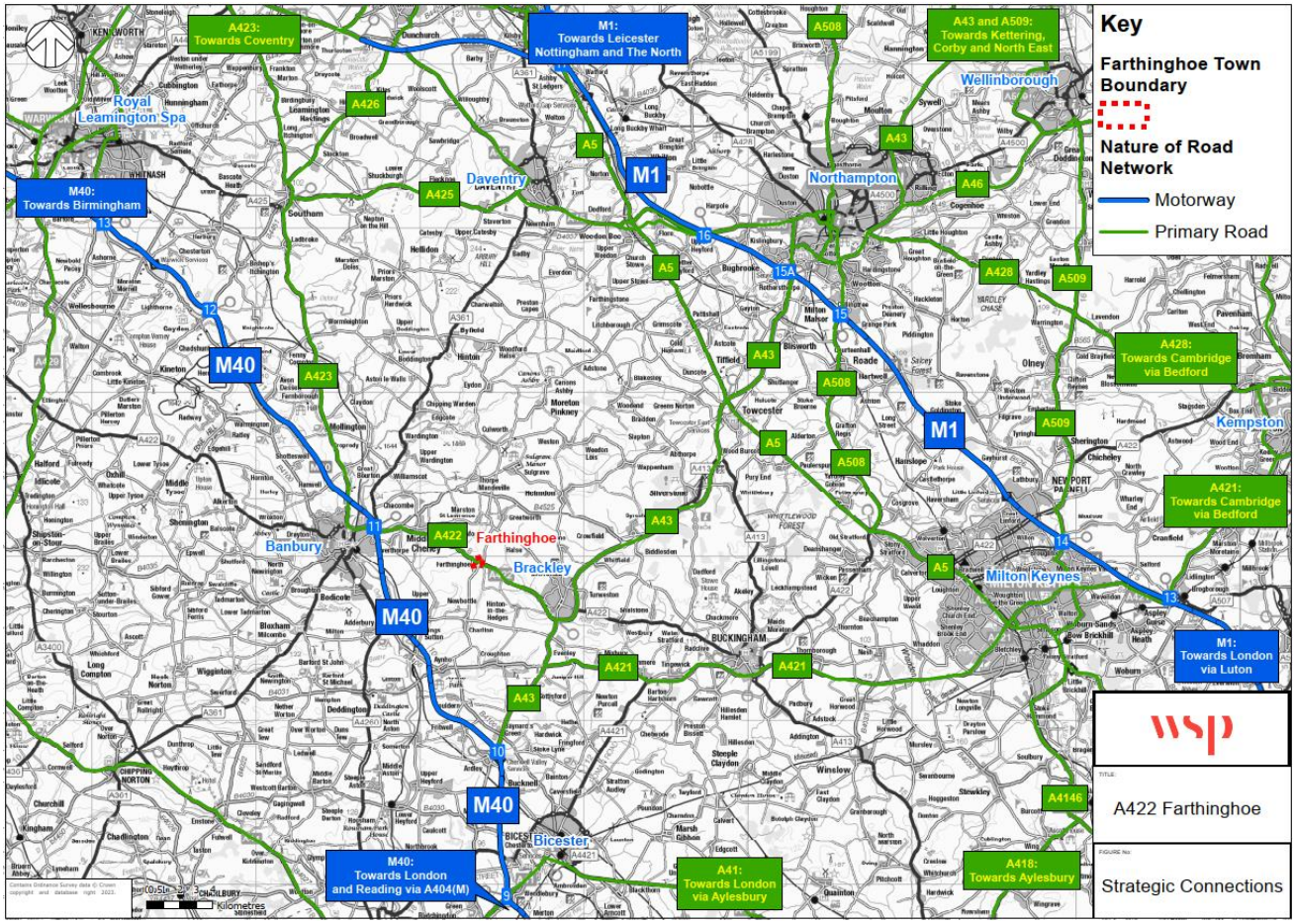


Figure 2-2 - Farthinghoe Strategic Connections

Major Road Network

2.4.4. The Government is committed to creating a Major Road Network (MRN) to allow for dedicated funding from the National Roads Fund to be used to improve the middle tier of the busiest and most economically important local authority A roads.

2.4.5. In March 2018, as Sub-national Transport Body for the region, England's Economic Heartland (EEH) provided a consultation response in relation to the proposals for the creation of the MRN. The EEH welcomed the recognition of the strategic importance of roads owned and operated by Local Transport Authorities.

2.4.6. The A422 provides a north-south link between the M40 and A43 trunk roads, serving Banbury and Brackley and destinations towards the southwest and northeast.

Local Road Network

2.4.7. The A422 provides a vital north-south link between Brackley and Banbury; and is the key route through, as well as providing access to the villages of Farthinghoe and Middleton Cheney. Within Farthinghoe various local roads connect to the A422, these are:

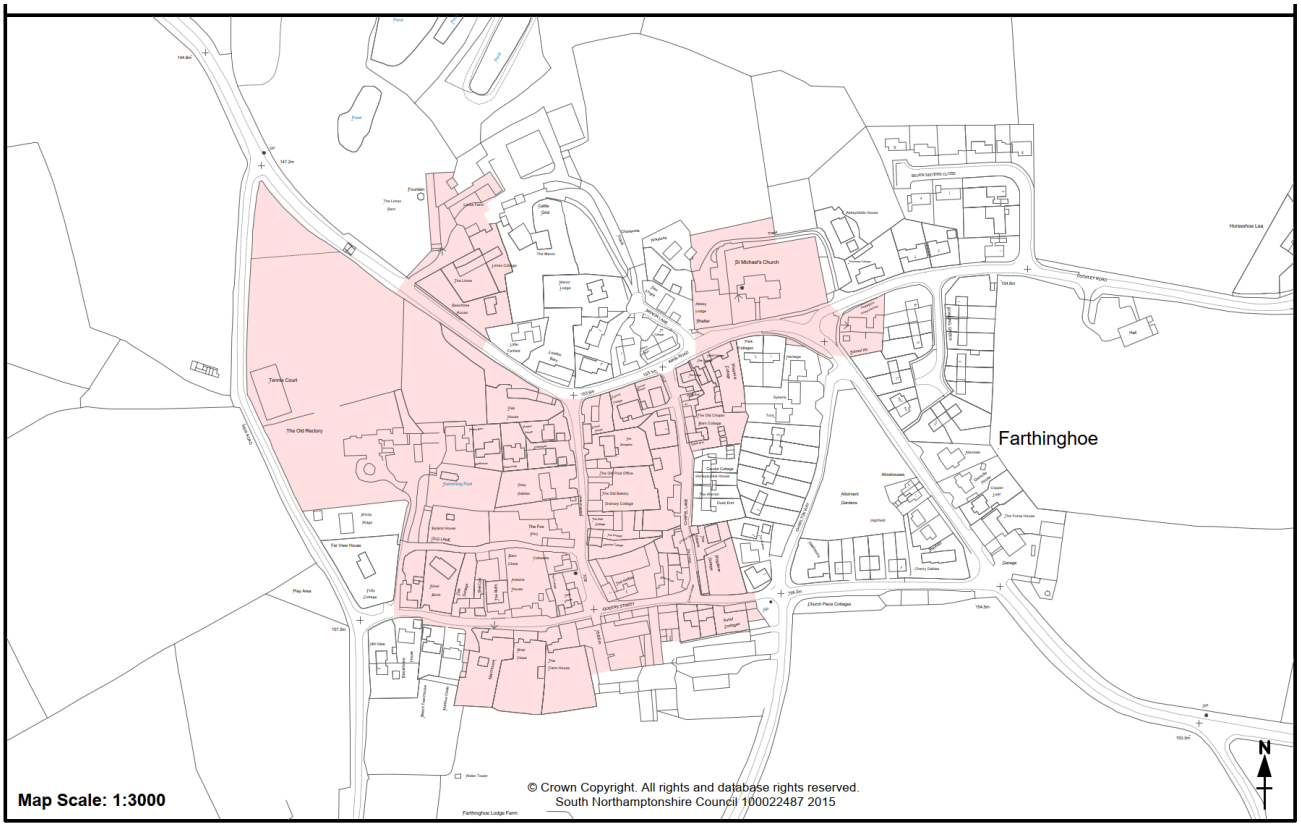
- Charlton Road/Queen Street/New Road providing a direct connection to Charlton village
- Cockley Road providing a connection to Greatworth village
- Numerous roads providing access to residential areas of the village, Baker Street, Chapel Lane and Manor Lane

2.4.8. The nature of the local roads around Farthinghoe are single carriageway links, connecting local villages and rural enterprises in the area. They are often subject to national speed limits outside settlements and if congestion occurs on the more strategic road connections in the area could attract rat-running traffic, causing safety concerns and affecting local communities that the local roads are designed to serve.

The A442

2.4.9. The existing A422 is an A-class road (approximately15.5km long) facilitating north south journeys in south central England between Banbury and the M40 in Oxfordshire and Brackley in West Northamptonshire.

2.4.10. From north the south the road begins at Hennef Way in Banbury at the junction with the A423 Southam Road. The road is a dual carriageway providing an east west route within Brackley and to junction 11 of the M40. East of the M40 the road is still a dual carriageway until its junction with the B4525 west of Middleton Cheney. South West of this junction the road is a single carriageway road subject to a 50 mph speed limit. The speed limit drops to 30 mph through Farthinghoe village. The majority of the village is a conservation area (shaded pink) as shown in Figure 2-3.



Source: West Northamptonshire Council

Figure 2-3 - Farthinghoe Conservation Area

2.4.11. Within the village there are two sharp bends, the width of the carriageways at the two bends measures 4.9m and 6.3m respectively.

2.4.12. Southwest of Farthinghoe village the A442 maintains the single carriageway layout and is subject to a 50mph speed limit until the junction with the Banbury Road to the west on Banbury. After the junction the A422 is subject to the national speed limit until the junction with the A43 south of Banbury.

2.5 CASE FOR CHANGE

PLACE-BASED ANALYSIS

2.5.1. To gain further understanding of the local area in close proximity to the bypass, detailed place-based analysis has been undertaken. The detailed report containing this analysis is contained in Appendix A. This section provides a summary of this analysis.

2.5.2. Analysis in the following three categories was undertaken:

- Demographic
- Economy and education
- Connectivity

Study Area

2.5.3. For the Place-Based Analysis study area, the 2021 census Lower Super Output Areas (LSOAs) of Brackley and Banbury have been used. The proposed bypass is located within the village of Farthinghoe, which is situated between the towns of Banbury and Brackley; and the census output areas includes the location of the bypass. For analysis where data for Banbury and Brackley was not available, the area of South/West Northamptonshire was used.

2.5.4. Figure 2-4 presents the study area (Banbury and Brackley output areas) within the wider West Northamptonshire region.

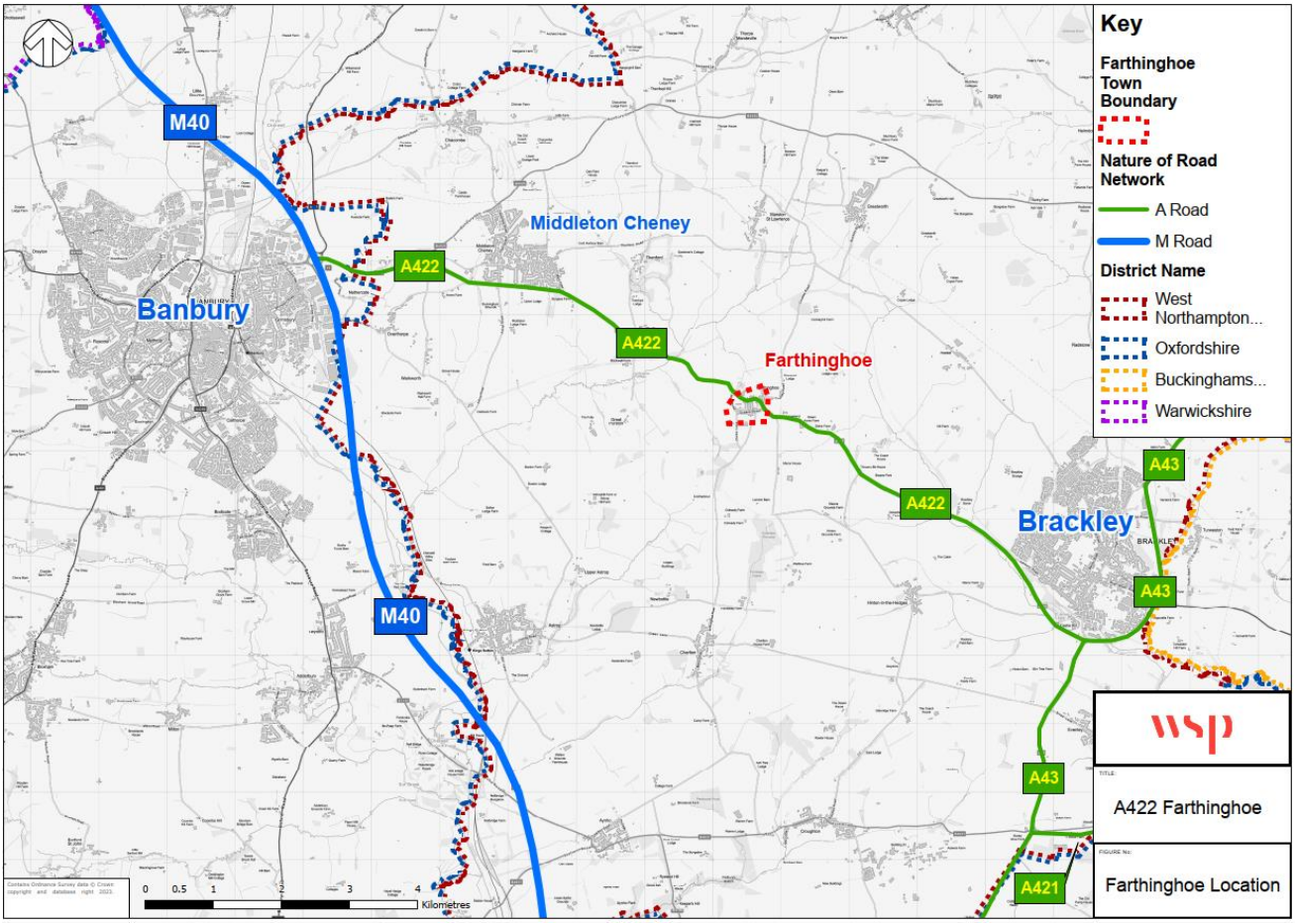


Figure 2-4 - Study Area

Overview of Analysis

2.5.5. Table 2-10 provides an overview of the analysis undertaken and a brief description of the findings.

Table 2-10 – Analysis Overview

Category	Analysis Undertaken	Overview
Demographics	Population Density	The population of the town centres of Banbury and Brackley are densely populated, whereas the surrounding areas, including the village of Farthinghoe are relatively sparse.

Category	Analysis Undertaken	Overview
	Population Growth	The population of West Northamptonshire grew at a significantly higher rate than the wider East Midlands area and England as a whole.
	Fertility Rate	The fertility rate in West Northamptonshire is significantly higher than the national average; reiterating that there is a significant amount of growth in West Northamptonshire.
	Age	There is a slightly lower percentage of under 18s in the study area compared to the country average. There is a larger concentration of pensioners in and around Farthinghoe and the rural region surrounding it, with the number of over 65s in the study area higher than the national average.
	Life Expectancy	The life expectancy in West Northamptonshire and the wider East Midlands region are broadly consistent with England, with West Northamptonshire generally performing slightly better. Cherwell (Oxfordshire) and the South East, which form the western boundary of the study area, generally show a life expectancy at birth considerably higher than England or the East Midlands.
Economy and Education	Average Earnings and Hours	in the West Northamptonshire region average annual pay levels are higher than the wider East Midlands region it sits within, as well as being higher than the national average. Oxfordshire (including Banbury) is higher on average than any of the other regions considered. Average hours worked for full-time workers in the East Midlands and the West Northamptonshire region in particular are significantly greater than in Oxfordshire, the South East or the UK as a whole. In conjunction with pay in West Northamptonshire area being lower than Oxfordshire, this means that full time workers are working longer hours for less pay.
	Unemployment and economic inactivity	The portion of the population of each of the regions in the study area who are unemployed has remained relatively stable between 2004 and 2022. West Northamptonshire shows the most fluctuation over the time period, alternating between having the highest rate of unemployment in 2009 to having the lowest in 2022.
	GVA	West Northamptonshire's GVA Per Head is almost directly in line with the National Average. Oxfordshire and the wider South East region has a markedly higher GVA. Notably, West Northamptonshire outperforms the wider East Midlands region within which it is located; the gap between the East Midlands and both West Northamptonshire and England's average having widened over time.

Category	Analysis Undertaken	Overview
	Indices of Multiple Deprivation	Farthinghoe is amongst the 50% least deprived areas of the UK. Brackley, King's Sutton and the rural locations south of the study area are amongst the 20% least deprived. Areas in the 50% most deprived are only found in Banbury, which also has several locations in the 20% most deprived.
	Qualifications	12% of residents of Farthinghoe and the surrounding area don't have formal qualifications. This is a lower portion than the national percentage without qualification (18%) as well as the regional averages of 14% and 17% for Oxfordshire and West Northamptonshire respectively. Within the study area, Banbury has several areas within the town where up to 35% of residents don't have formal qualifications. There is also an area southwest of Brackley where between 21% and 25% of residents have no formal qualifications.
	Student population	The greater percentage of students can be found in the areas around Banbury and Middleton Cheney. The rural area containing Farthinghoe has a lower percentage of students, whilst Brackley is between the two
Connectivity	Car Availability	The study area and wider West Northamptonshire area has a higher percentage of households with access to a car compared to the national average.
	Travel to Work – Distance to Work	Between 41% and 50% of residents travel under 10km to work, 31% to 40% travel between 10 and 30km, with the remaining 21% to 30% travelling over 30kms to work.
	Travel to Work – Place of Work	Most of the residents within the study area work within Banbury and Brackley.
	Travel to Work – Mode	The majority of residents travel to work via car or van (84%). This is followed by 7% who travel via walking and 1% by cycling. Only 1% travel to work using bus and 1% use rail. Car travel is lightest in the town centres and most prominent within the rural area. Active travel and public transport use are more common within the centres.
	Network Overview	The study area is served by the M40, the A43 and the M1. The A422 Farthinghoe Bypass is proposed to run parallel, and connect, to the existing A422 north of the village.

PUBLIC TRANSPORT MODES

2.5.6. Ultimately, the public transport within the village of Farthinghoe and the surrounding study area is limited.

2.5.7. In terms of rail travel, the village of Farthinghoe does not have a rail station, it closed in 1963. The closest located rail station is Kings Sutton. This is located approximately 7.5km from Farthinghoe and can be accessed via car along the Charlton Road/Farthinghoe Road

2.5.8. Bus is a predominant mode of public transport within the study area. Two bus routes serve Farthinghoe. Route 500 by Stagecoach provides an hourly service between Bicester and Banbury calling at Brackley and Middeleton Cheney. Route 132 by Redline buses provides a Saturday service between Banbury and Buckingham via Brackley. Both services can be accessed from the stops located by St Michael's Church and the Almshouses.

ACTIVE TRAVEL MODES

2.5.9. Within Farthinghoe village there are footways along both sides of the A422 from the Baker Street junction to the Queen Street junction. These footpaths are narrow (approximately 1m in width) apart from by the church where it widens on the northern side.

2.5.10. There are also several Public Rights of Way (PRoWs), within the locality of the scheme. These are shown in Figure 2-5.

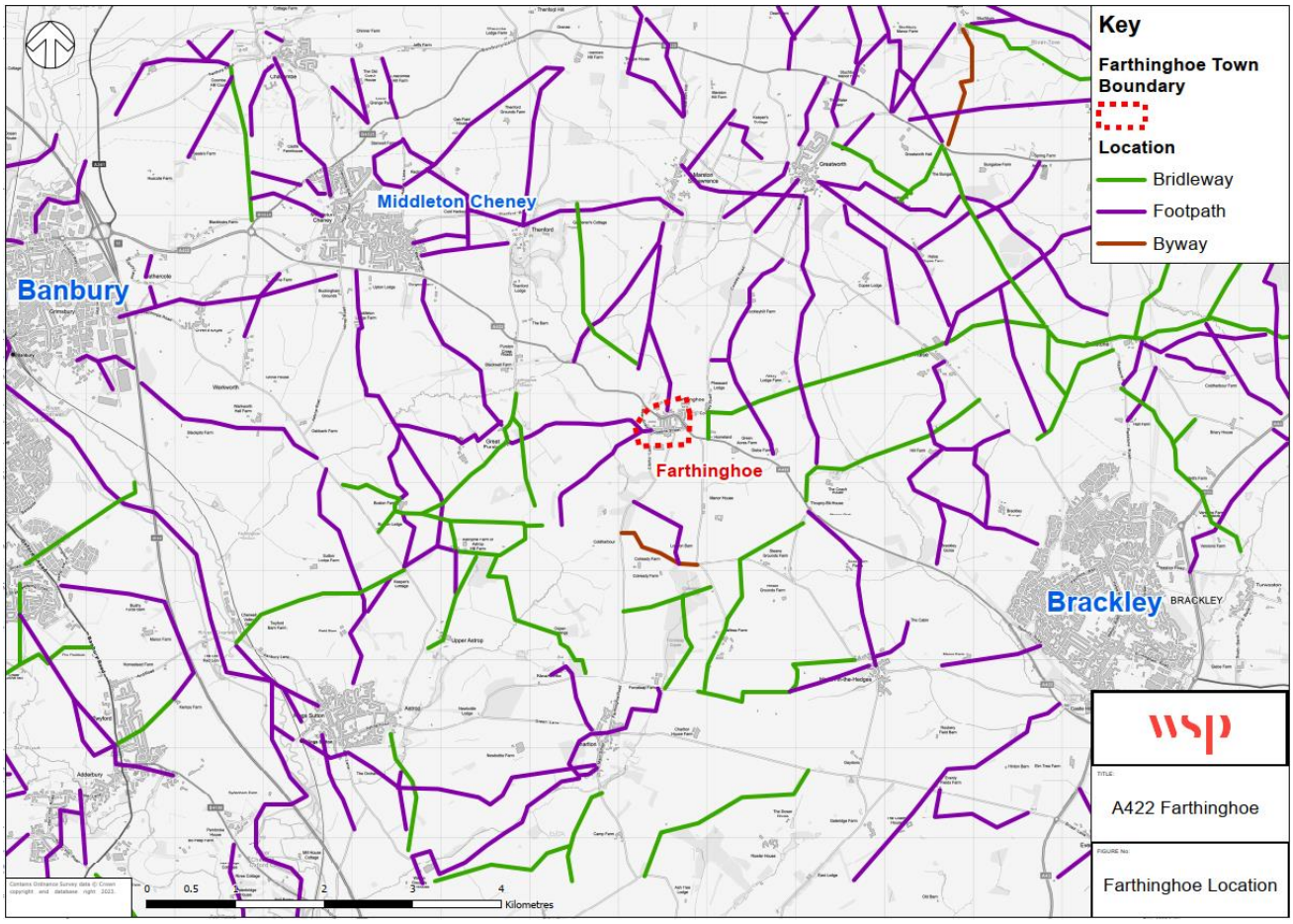


Figure 2-5 -PRoWs around Farthinghoe

2.5.11. There are unmade footpaths between Farthinghoe and Banbury, as well as routes to other nearby villages of King's Sutton, Charlton and Greatworth.

2.5.12. There are no cycle facilities within or around Farthinghoe, the closest are in Brackley to the southeast of the village and Banbury to the northwest.

TRAFFIC ISSUES AND CONGESTION

2.5.13. Recent survey data collected in 2022 shows that on an average weekday approximately 9,500 vehicles use the A422 to travel through the village. Of these 13% are light goods vehicles and 7% are HGV's.

2.5.14. The Northampton Strategic Transport Model (NSTM) has been used to inform and evidence the current traffic-related problems in Farthinghoe and the surrounding area.

2.5.15. Traffic flows based on the NSTM, show that the traffic volumes on the A422 through Farthinghoe stay relatively low reaching about 13,000 by 2027. Interrogation of open source journey time data also indicates that the village does not have any congestion or delay issues.

2.5.16. The A422 within Farthinghoe is identified as a Noise Important Area (IA). The IAs highlight "hotspot" locations where the highest 1% of noise levels at residential locations can be found.

2.5.17. The issues to be addressed are the sharp bends and narrow carriageways which restrict two HGV's, travelling in opposing directions, manoeuvring around the bends together. The HGVs that pass through the A422 would create noise and safety concerns within the village.

Collisions

2.5.18. Stats19 data was interrogated over a five period from 2015 to 2019 inclusively, data from 2020 and 2021 was not included as this covered the Covid 19 lockdown period. Stats19 data only covers personal-injury collisions reported to the police.

2.5.19. Over the five year period, three collisions were recorded within Farthinghoe, two were classified as slight with one classified as serious. One slight collision occurred at the junction with Baker Street and involved one casualty. At the Hinton Airfield junction two collisions were recorded, one classified as slight with the second classified as serious. Both collisions had one casualty.

2.5.20. Northwest of Farthinghoe there is a cluster site by Farthinghoe Nature Reserve. Five collisions were recorded here, four classified as slight and one classified as serious. All five collisions occurred on the bend approximately 1.3km northwest of the village.

2.5.21. Southeast of Farthinghoe there is a cluster site by Steane Park Gardens approximately 1.5km from the village. Five collisions were recorded here, two classified as slight, two classified as serious and one classified as fatal. This gives a higher killed and seriously injured ratio than would normally be recorded on this type of road.

2.6 IMPACT OF NOT CHANGING

2.6.1. Whilst economic growth is dependent upon several factors, support from transport infrastructure and providing good transport links are essential to optimise the economic prosperity of the region. The West Northamptonshire Infrastructure Delivery Plan (IDP) sets out that "Brackley will be the major service provider for the residents of the town and the surrounding countryside. It will provide knowledge based, research and high technology based jobs and leisure facilities as well as a

distinctive and vibrant historic town centre which will offer both retail opportunities and community services and facilities."

2.6.2. West Northamptonshire, which includes key growth towns such as Brackley and Towcester, needs to be accessible for inward investment, and local businesses require access to competitive markets, suppliers and labour both regionally and nationally. Improved accessibility, reflected by high quality strategic transport routes without major congestion or overcrowding, will provide the optimum conditions for attracting more diverse businesses, generating more varied, skilled jobs and greater income, and addressing the region's areas of underperformance.

2.6.3. The A422 Farthinghoe Bypass was not listed as a scheme in the West Northamptonshire IDP. However, there is a need to address the existing traffic issues in the village of Farthinghoe, which causes negative social and environmental consequences.

PLANNED HOUSING AND EMPLOYMENT DEVELOPMENT

West Northamptonshire

2.6.4. Significant housing and employment growth is planned in West Northamptonshire, with two Sustainable Urban Extensions (SUE's) totalling 1,730 dwellings proposed at Brackley to the north and the east.

Brackley East SUE

2.6.5. The Brackley East Sustainable Urban Extension (SUE) is located between the A43 and the existing urban edge. The site is divided into two distinct parts by Turweston Road.

2.6.6. The land to the north of Turweston Road is a greenfield site currently in agricultural use. It has the potential to be a key gateway site into Brackley from the north and the A43. South Northamptonshire Council has granted outline planning permission for a business park development on the site. More recently the Council has granted planning permission for an alternative mixed use development. The proposed development comprises: a new food store; petrol filling station; 60 bed nursing care home (including the relocation of the Brackley Cottage Hospital's 12 beds); a new Primary Care Centre facility including a new pharmacy; employment development within Use Classes B1, B2 and B8, and a hotel (circa 70 beds) including a restaurant and bar.

2.6.7. Outline planning permission was granted (S//2013/0149/MAF) for the site. The section of the site to the north of Turweston Road has already been delivered and occupied.

Brackley North SUE

2.6.8. The Brackley North SUE is bounded by the existing urban edge of Brackley to the south, by Halse Road to the west, and extends to the junction of Northampton Road and the A43 in the east. The site slopes down to the northern boundary which is defined by a stream corridor and an established hedgerow. Radstone Road and the route of the former Great Central Main Line run through the site in a north south direction.

2.6.9. The allocated site also includes the Brackley Sawmills site to the south. The inclusion of this site will enable a comprehensive approach to the development of this part of Brackley. South Northamptonshire Council has granted planning permission for 130 dwellings on the Sawmills site and for 1,000 dwellings on land known as Radstone Fields.

2.6.10. As a sustainable urban extension to Brackley the site will deliver a new neighbourhood of up to 1,380 dwellings, with strong links to the town centre and surrounding areas. The development will bring forward a new primary school, and new local centre, formal and informal open space and other infrastructure for the benefit of existing and future residents. A section of this SUE has already been developed and occupied.

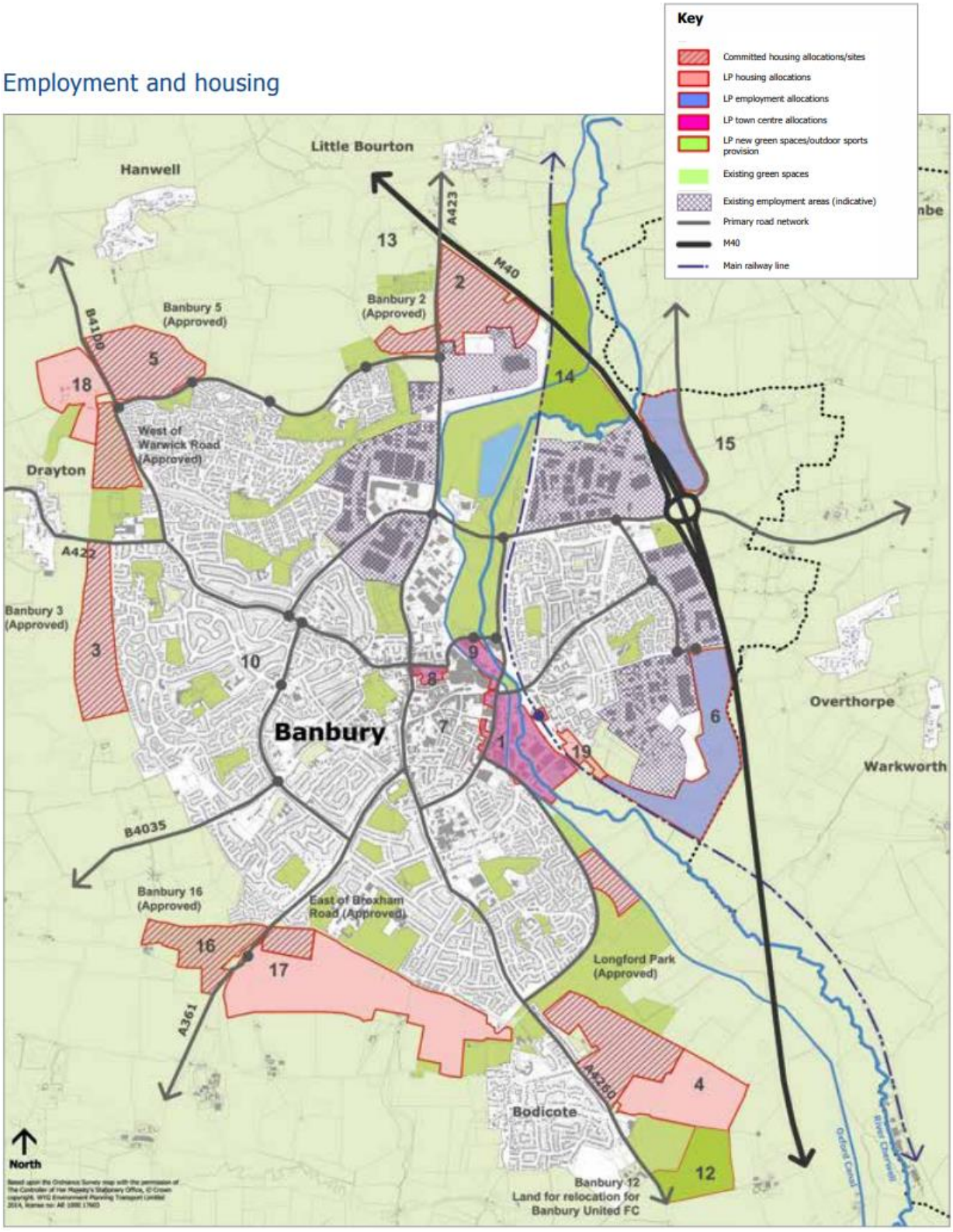
Cherwell

2.6.11. The Cherwell Local Plan anticipates that Banbury town will continue to grow significantly by 2031, with new employment and residential areas proposed, and creation of a more diverse economy. By 2031, the adopted Local Plan (2016) proposed that there will be an additional 7,319 houses and 3,500 jobs in Banbury, at key employment sites including Central M40, to the east of Banbury (2,500 jobs); and on land North East of M40 Junction 11 (1,000 jobs).

2.6.12. The Banbury Masterplan adopted in 2016 has much of the development on the outer edges of the town as shown in Figure 2-6. The housing allocations are located to the north, to the south and to the west of the town, with the employment located to the east of the town close the Junction 11 of the M40, around the existing employment sites.

2.6.13. The employment plot (Frontier Park) to the northeast of the motorway junction has been partially developed for warehousing/logistics. The plot to the southwest of the junction has also been developed and forms an extension to the existing Overthorpe Industrial Estate.

2.6.14. The housing allocations showing as committed have been developed since the publishing of the Masterplan, some development has started on plot 17 of the LP housing allocations to the east side of the plot with residencies built and occupied.



Source: Banbury Vision and Masterplan.

Figure 2-6 -Banbury Employment and Housing Growth

2.7 DRIVERS OF CHANGE

2.7.1. The West Northamptonshire joint Core Strategy Local Plan (part 1) has highlighted movement and access as one of the main goals for planning within the area. It is mentioned that the provision of infrastructure to encourage and enable access by walking, cycling and public transport is the mean to achieve the goal.

2.7.2. There is currently limited provision for walking, cycling and horse riding throughout the village. The existing A422 is served by a narrow footway throughout the village, and there is a signalised crossing facility near the primary school. The A422 Farthinghoe Bypass Next Steps Proposal has mentioned that the assessment of potential walking, cycling and horse-riding provisions will be provided to ensure the strategic alignment of the bypass with the Local Development Plan.

2.7.3. Farthinghoe is a village with a population of approximately 400 people. The majority of the area is a conservation area with a parish church, primary school and public house. The village is a designated area for preservation and enhancement for its special character of the settlement. The Farthinghoe Conservation Area Appraisal and Management Plan (2025) has set out the objectives for preserving the conservation area. The existing A422 passes through the village and part of the designated conservation area. There are 32 properties that are fronting the carriageway, and many include vehicular access.

2.7.4. The A422 within Farthinghoe is identified as a Noise Important Area (IA). The IAs highlight “hotspot” locations where the highest 1% of noise levels at residential locations can be found.

2.7.5. The proposed bypass would not pass through the village and therefore would not detract from the unique character of the conservation area. And it would align with the objectives in the Farthinghoe Conservation Area Appraisal and Management Plan to preserve the conservation area. It also addresses the traffic threats named in the plan. It is highlighted that the flow of traffic and street parking affects the appearance of the conservation area. By reducing traffic, the proposed A422 Farthinghoe bypass would improve air quality and alleviate noise pollution within the settlement area.

2.7.6. When the transport problems and issues are considered collectively, a clear need for intervention is established. The key identified drivers of change are:

- **The government’s MRN objectives**

  The need to deliver the government’s objectives for the MRN (reduce congestion, support economic growth, support housing development, support all users and support the SRN).

- **Housing and employment targets**

  The need to deliver local targets for housing and employment growth in line with planning and economic strategies.

- **Economy**

  The need to support the local and regional economy by improving connectivity and reducing congestion to improve accessibility to employment and education; as well as the need to improve journey times and journey time reliability to support the freight and logistics sector.

- **Community**

The need to ensure a good quality of life for people living and working in and near to Farthinghoe, by contributing to improving air quality and reducing noise within Farthinghoe.

- **Active travel**

  The need to enhance active travel provision to improve choice of transport modes for those travelling in West Northamptonshire, helping to reduce transport emissions and provide safe choice of travel for all.

2.8 OBJECTIVES

2.8.1. The drivers for change, as well as the problems and challenges identified have helped to shape the strategic themes and objectives of the scheme, so that they are tailored to address the locally specific and strategic issues of the A422 Farthinghoe study area.

2.8.2. The scheme specific objectives that the proposed bypass scheme will address are:

- To improve journey time, reliability and resilience between Banbury, Brackley and the SRN
- To achieve a net reduction in greenhouse gas emissions
- To remove through traffic, including HGV's from Farthinghoe
- To improve conditions for those walking or cycling in Farthinghoe
- To reduce noise and vibration in Farthinghoe
- To improve air quality in Farthinghoe
- To support key employment and housing sites in Brackley

2.9 MEASURES OF SUCCESS AND PLANNING FOR DELIVERY

2.9.1. To ensure that the success of the objectives is measurable, they were developed as SMART objectives and as such are.

- **Specific** – say in precise terms what is sought
- **Measurable** – the means by which satisfaction, whether or not the objective has been achieved, can be assessed
- **Attainable** – general agreement that the objective set can be reached
- **Relevant** – the objective is a sensible indicator or proxy for the change which is sought
- **Timed** – the objective will be associated with an agreed future point by which it will have been met

2.9.2. Developing the objectives in such a way provides a clear definition of what constitutes a successful outcome and provides a measurable output. A Logic Map has been developed linking the objectives to outputs, outcomes and impacts.

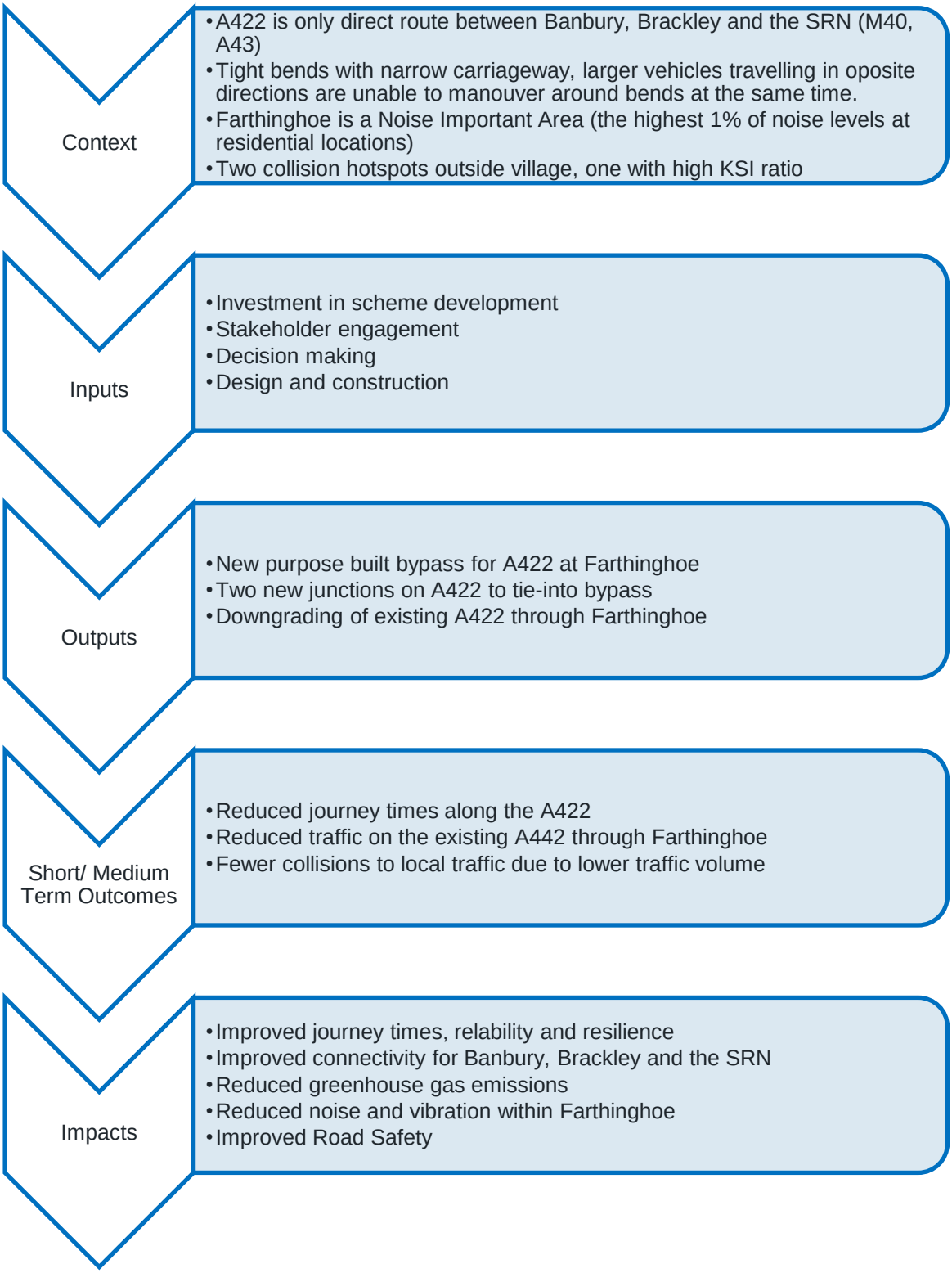


Figure 2-7 - A422 Farthinghoe Bypass Logic Map

2.10 SCOPE

2.10.1. The A422 Farthinghoe bypass will provide an all-purpose single carriageway (S2AP) to the north of the village, it will connect to the existing A422 via two new junctions about 1 km to the East and

West of Farthinghoe village. Two new bridge structures have been identified with the bypass, these are both road overbridges. Crossing over Cockley Road and Abbey Lodge access road.

2.11 INTERDEPENDENCIES

2.11.1. There are no other schemes or developments that the A422 Farthinghoe bypass scheme is dependent on.

STATUTORY PROCESSES

2.11.2. Delivery of the scheme depends on the successful completion of a number of statutory processes.

2.11.3. A planning application for the bypass will need to be submitted. It is envisaged that a Compulsory Purchase Order (CPO) will be required to secure the land to construct the bypass and meet the Biodiversity Net gain +10% requirements. Detailed land referencing works will need to be undertaken to establish all parties with interests in the land required.

2.11.4. A Side Road Order (SRO) will be required to cover alterations made to the existing highway network e.g., where existing roads are stopped up, diverted or where they connect to the new highway. Traffic Regulation Orders will also be required, this includes both permanent orders, as well as temporary orders to cover the construction period.

2.11.5. It is likely that Public Inquiries for the various Orders and planning permission will be required. These are expected to run concurrently.

2.12 RISKS AND CONSTRAINTS

2.12.1. Various constraints have been identified in the A422 Farthinghoe Bypass Scheme Assessment Report that could potentially affect the area in the vicinity of the Farthinghoe Village as well as the delivery of the scheme.

2.12.2. The key constraints for the scheme include:

- Areas of land within the Flood Zone: A review of the Environment Agency's Flood Map for Planning (River and Sea) indicates that all of the proposed options are located in the low-risk Flood Zone 1. There is an annual probability of flooding from Fluvial sources of less than 1 in 1000 (0.1%). Land adjacent to Farthinghoe Stream and Hinton Stream is indicated to be located in the high-risk Flood Zone 3. There is an annual probability of flooding from fluvial sources of greater than 1 in 100 (1%).
- Environmental constraints: issues including habitats, Sites of Special Scientific Interest in the wider area, biodiversity, ecology, landscape, nature improvement areas, townscape and heritage must be considered.
- Any below-ground heritage assets within the Proposed Scheme, for instance, Northern Option V0-3, have potential to be partially or wholly disturbed as a result of those construction activities outlined above.
- The route of Northern Option V0-3 passes directly through the site of a Romano-British settlement (MNN3365) of medium value. The impact during construction would be permanent Major Adverse with a Large Adverse effect.
- The Farthinghoe Conservation Area, which includes designated and non-designated heritage assets, is of high value. The Northern options (V0-3) sits approximately 225 m to 315m from the conservation area. The construction work could potentially disrupt the direct views northwards from Grade I listed Church of St Michael (MHLE1192622) and Grade II listed Barn approximately 8 metres North of The Limes (MHLE1371823).

- There would be moderate adverse temporary effects created by the construction of Northern Route options. These temporary impacts include noise, dust, pollution and construction and vehicle lighting.

2.13 STRATEGIC ASSESSMENT OF INVESTMENT OPTIONS

2.14 LONGLIST OF OPTIONS

2.14.1. There are various intervention options to mitigate the identified issues on the A422 at Farthinghoe. The three main intervention options include providing highways infrastructure, implementing highways regulations, and improving highway design.

Table 2-11 – Longlist of options

Intervention	Options	Objectives achieved	Feasibility
Highways Infrastructure	▪ New road (A422 Farthinghoe Bypass)	▪ Reduce traffic flows through the village of Farthinghoe, particularly the HGVs ▪ Improve local and strategic resilience on the Strategic Road Network, particularly on the A422 and the vicinity of Farthinghoe Village. ▪ Support the improvement of air quality in the vicinity of Farthinghoe. ▪ Support a safer and more attractive environment within the Farthinghoe village. ▪ Reduce the number and severity of road traffic collisions, particularly at the sharp bends on the A422.	▪ The Benefit Cost Ratio (BCR) shows that the scheme is 'poor' value for money.
	▪ Provide signalised control at the junction	▪ Reduce the speed of the HGVs driving through the village. ▪ Support a safer and more attractive environment within the Farthinghoe village ▪ Reduce the number and severity of road traffic collisions, particularly at the sharp bends on the A422.	▪ It can be implemented at a comparatively lower cost than constructing a bypass. ▪ The traffic signal can be installed at the T intersection to stop two HGVs travelling through the bend at the same time.
Highways Regulation	▪ Reduce speed limits through village	▪ Support a safer and more attractive environment within the Farthinghoe village. ▪ Reduce the number and severity of road traffic collisions, particularly at the sharp bends on the A422.	▪ The existing speed limit for HGVs on the A422 within the Farthinghoe Village is 10 mph. Further limiting the speed limit is not practical and will create traffic delay.

Intervention	Options	Objectives achieved	Feasibility
	▪ Limit the number of heavy vehicles in peak times	▪ Support a safer and more attractive environment within the Farthinghoe village. ▪ Reduce the number and severity of road traffic collisions, particularly at the sharp bends on the A422.	▪ Measures to limit the number of HGVs is difficult to implement and it may hinder the economic development
	▪ Ban HGV's from the route through the village	▪ Reduce traffic flows through the village of Farthinghoe, particularly the HGVs ▪ Support a safer and more attractive environment within the Farthinghoe village.	▪ A TRO would be required to implement the change. ▪ There are no other feasible routes between Banbury and Brackley for HGV's without large diversions
Highways Design	▪ Widening the carriage	▪ Allowing HGV's to manoeuvre around bend easier ▪ Lower the number and severity of the accidents	▪ Involves changing the boundary of the existing highway and buildings. Consultation and implementation will be time consuming. Also, the directly impacted residents are likely to object.

DEVELOPMENT OF OPTIONS AND INITIAL SIFTING

2.14.2. Five possible route corridor options were considered for the Bypass, four to the north of Farthinghoe and one to the south of Farthinghoe. These were appraised against relevant Standards, Policies, Plans and Guidance as well as the appropriate Legislation. The five route options are shown in Figure 2-8.

2.14.3. The results show that there are marginal differences between the routes considered both technically and environmentally with no route standing out either technically or environmentally above the rest.

2.14.4. A feasibility Study undertaken in 2015 discounted the southern route. Of the four remaining northern routes two were taken forward for further assessment. They are Northern Option V1 (orange) and V0 (blue).

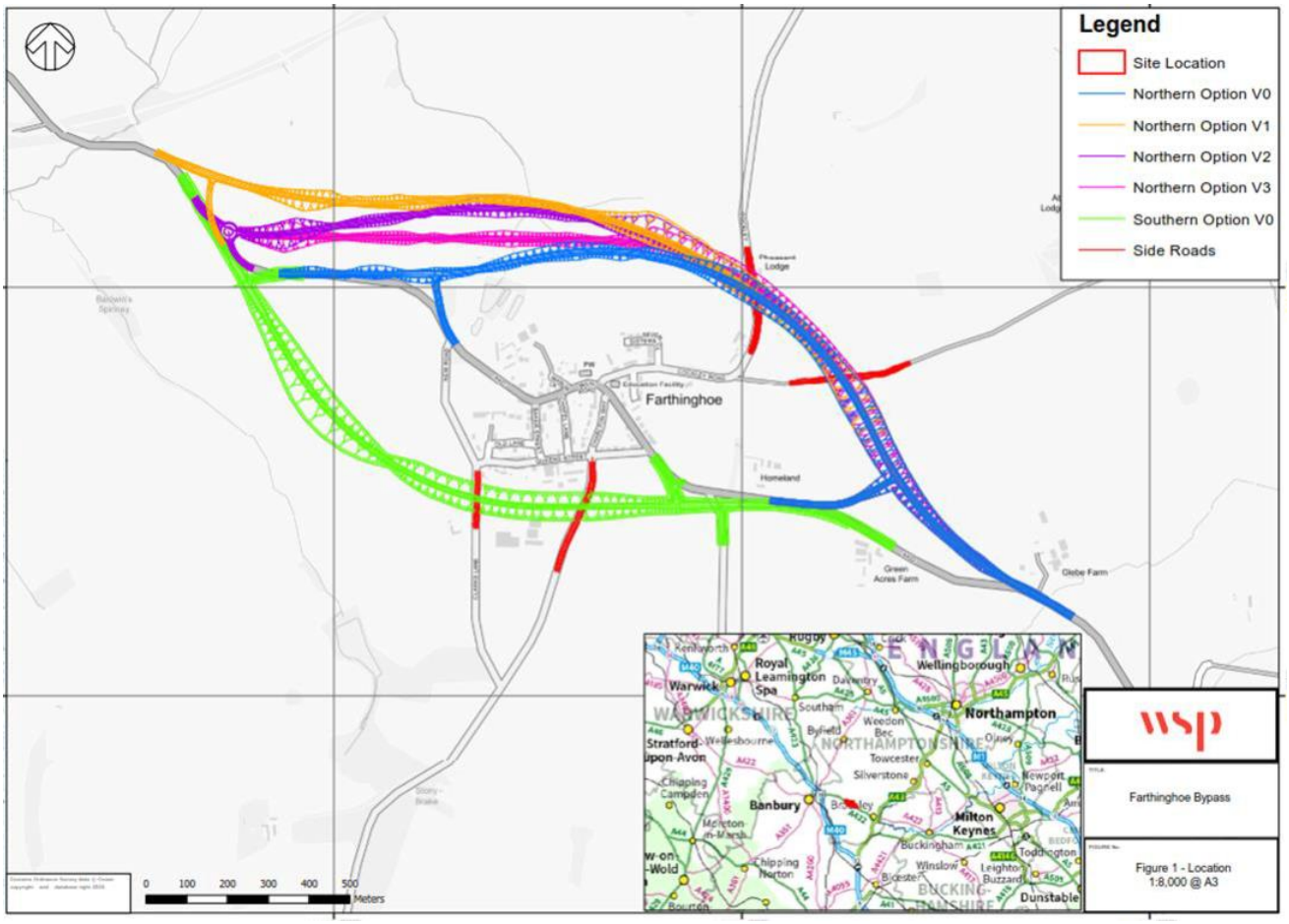


Figure 2-8 - Bypass Options

WALKING, CYCLING AND HORSE RIDING

2.14.5. There are three footpaths and two bridleways located within the study areas for Northern Option V0, Northern Option V1.

2.14.6. There are non-designated routes located alongside the roads in Farthinghoe, which are within the study areas for all options.

2.14.7. There are no cycle routes or long distance routes located within the study area as stated in the A422 Farthinghoe Bypass Scheme Assessment Report.

2.15 STAKEHOLDERS' VIEWS AND REQUIREMENTS

2.15.1. A list of the main stakeholder groups and a summary of their contribution/ specific interests to the scheme are outlined in the table below. These have been scored on a three point scale according to their level of interest and power of influence over the progression of the A422 Farthinghoe Bypass scheme.

Table 2-12 - Stakeholder Groups Summary of Interests and Influence

Stakeholders	Summary of Interests	Interest	Influence
Business owners	Business owners in Farthinghoe and the wider West Northamptonshire area will be interested in how the scheme will impact upon their business.	High	Medium
Department for Transport (DfT)	Interested in the detailed plans, development of the business case and submissions, funding and planning. Will also be interested in how the scheme will deliver additional capacity to the highway network and help improve and support the efficient movement of people and goods on the local and strategic network.	High	High
Directly affected landowners	Interested in land take and engineering requirements of the A422 Farthinghoe Bypass and how this will affect them directly.	High	Medium
Emergency services (i.e. Police /Fire/ Health)	Interested in how the scheme will impact upon their service provision, accessibility and permeability.	Low	Low
England's Economic Heartland (EEH)	As the Sub-national Transport Body for the region, EEH will be interested in the detailed plans, development of the business case and submissions, funding and planning.	High	High
Environment Agency	Interested in environmental legislation relevant to construction, air quality, noise and flooding issues.	Medium	Medium
National Highways	Interested in the impact of the scheme on the Strategic Road Network and junctions on the network.	High	High
Indirectly affected landowners	Interested in the land take and engineering requirements of the A422 Farthinghoe Bypass and how this will affect them indirectly.	High	Medium
Farthinghoe Parish Council	Interested in how the A422 Farthinghoe Bypass will affect the distribution of traffic in Farthinghoe village and alleviate congestion on the A422 and in the village.	High	Medium
Media Groups	All issues relating to the A422 Farthinghoe Bypass may be of public interest.	Low	Low
Natural England	Interested in the natural environment. To ensure that areas with environmental designations are conserved, enhanced and managed.	Medium	Medium
West Northamptonshire Council	As main scheme promoted going forwards, West Northamptonshire Council will have heavily vested interests in the delivery of the A422 Farthinghoe Bypass. Interested in how the A422 Farthinghoe Bypass will affect the distribution of traffic in the West Northamptonshire area. They are also the planning authority for the area of scheme.	High	High
Residents/Public	Interested in issues surrounding all aspects of the scheme, such as noise pollution, visual impact, traffic implications, traffic managements, construction issues, planning issues, environmental issues and design.	High	Medium
Service providers (i.e. Anglian Water, BT Openreach, etc)	Essential services such as water, electricity and powerlines will be interested if they are potentially affected by the bypass.	Low	Low

Stakeholders	Summary of Interests	Interest	Influence
Transport groups (i.e. bus companies, freight organisations, etc)	Interested in issues surrounding transport companies, such as route changes and journey times.	Medium	Low

3 ECONOMIC CASE/DIMENSION

3.1 INTRODUCTION

3.1.1. This section presents the economic case for the A422 Farthinghoe Bypass scheme. The economic case appraises the proposed scheme to identify its economic impacts, and the resulting Value for Money (VfM). The appraisal of impacts will not be limited to the monetised measured economy and will include economic and environmental impacts as well as social and distributional impacts.

3.2 ECONOMIC APPRAISAL METHODOLOGY

3.2.1. The economic appraisal of the scheme has been undertaken in accordance with current Transport Analysis Guidance (TAG), including:

- TAG Unit A1 cost-benefit analysis
- TAG Unit A2 economic impacts
- TAG Unit A3 environmental impacts
- TAG Unit A4 social, distributional and place based impacts
- DfT Value for Money Framework

3.2.2. The methodology is based on the DfT Value for Money Framework and is illustrated in Figure 3-1.

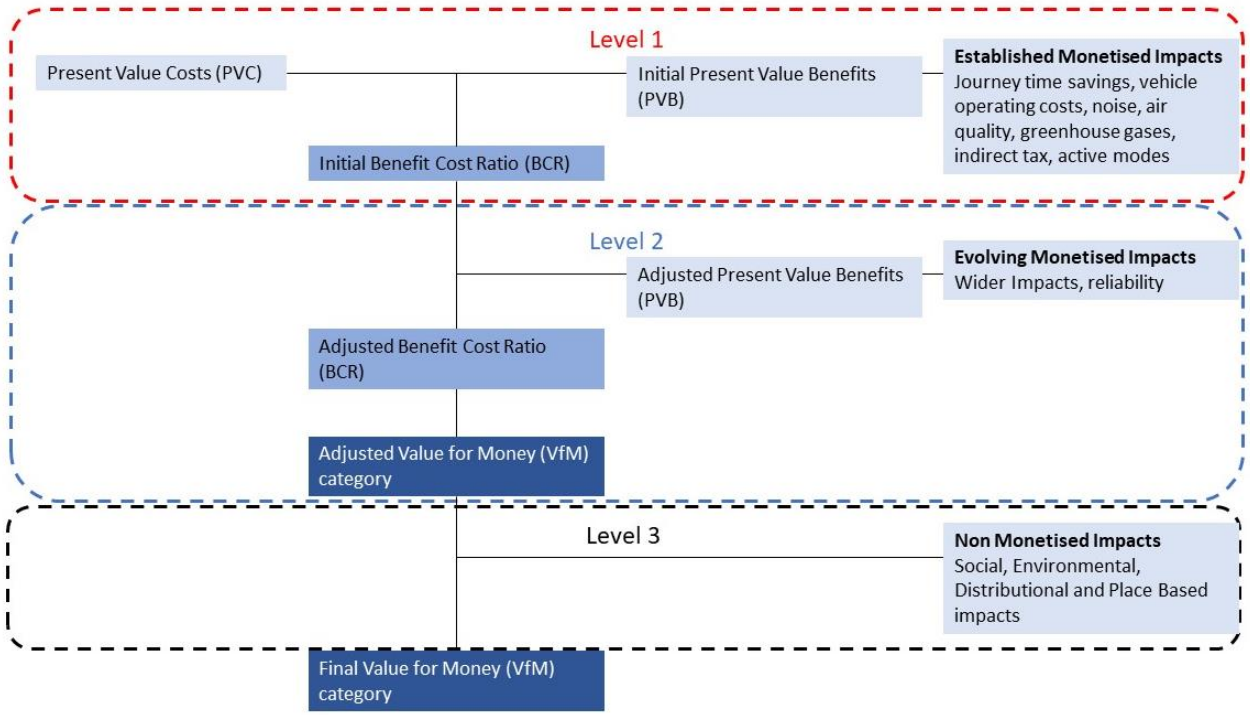


Figure 3-1 - Process to derive BCR and Value for Money Category

3.2.3. The DfT Value for Money Framework identifies three categories of monetised impacts and a set of non-monetised impacts:

- **Established:** where the method for estimating the impact and the monetary value is tried-and-tested (these impacts can be captured in **Level 1** of the VfM analysis and contribute to the initial Benefit Cost Ratio (BCR) calculation)
- **Evolving:** where some evidence exists to support the estimation of a monetary value but is less widely accepted and researched (these impacts can be captured in **Level 2** of the VfM analysis and contribute to the adjusted BCR)
- **Indicative**: where monetary valuation methods are not considered widely accepted or researched to be definitive, with a high degree of uncertainty in terms of the magnitude of the impact (these impacts can be captured in **Level 3** of the VfM analysis)

3.2.4. In line with the DfT Value for Money Framework, only the established and impacts were combined to derive the monetised impacts. These were compared with costs to produce the BCRs.

3.3 OPTIONS ASSESSED

3.3.1. Both preferred options, Northern V0 and Northern V1, outlined in the Initial Economic Analysis (ICA) Report conducted by WSP in 2020 have been assessed.

3.3.2. In the previous ICA the Northern V0 option offered a slightly better Benefit-Cost Ratio (BCR) as it is more cost-effective due to its shorter alignment. The Northern V1's alignment was favoured by the local Parish council, despite having a slightly lower BCR. By analysing both options, we can ensure that a comprehensive consideration of the benefits associated with each option has been undertaken, building upon the previous ICA.

3.4 METHODOLOGIES, ASSUMPTIONS AND DATA

HIGHWAY MODEL

3.4.1. The highway assignment model component Northamptonshire Strategic Transport Model (NSTM2 (Northamptonshire Strategic Transport Model 2)) has been developed using SATURN as a foundation. This model aims to forecast the effects and impacts of proposed developments in and around Northamptonshire. The utilisation of SATURN software, known for its detailed junction delay capabilities, allows for an accurate representation of the road network and junctions. Consequently, the model provides as precise a depiction as possible of the flows, speeds, and delays on the road network.

3.4.2. The model has been developed in accordance with Department for Transport (DfT) Transport Appraisal Guidance (TAG) standards and represents the:

- AM peak hour: (08:00-09:00)
- InterPeak hour (10:00-16:00)
- PM peak hour: (17:00-18:00).

3.4.3. The modelled vehicle types included in the NSTM2 include:

- Car – Employer's Business
- Car – Commuting
- Car – Other
- LGV
- HGV (OGV1 and OGV2).

3.4.4. The base year of the NSTM2 is 2015 and details on the validation and calibration of the full NSTM2 is reported in “NSTM2 Major Model Update Local Model Validation Report (LMVR)” (April 2017).

3.4.5. A local area re-Validation of the AM peak, Interpeak and PM peak base year models around the proposed ‘Farthinghoe Bypass’ have been undertaken. As part of local model validation and calibration around Farthinghoe, traffic count data collected in 2015 and 2022 has been used to present yearly traffic flows on the road network. The updated LMVR that details the calibration and validation of the NSTM around the proposed Farthinghoe bypass (July 2023) are provided as a separate report.

3.4.6. Coding enhancements have been made to the 2015 NSTM2 base model to better reflect real world conditions in the local area. The data used for validation was collected in 2015 and 2022, and the model has consequently been updated to reflect 2015 road conditions. The data collected in 2022 has been factored down to represent 2015 road conditions and has been used to validate the model. This enables the base model to be compatible with the traffic count data in its respective immediate area and provides a robust methodology to carry out local validation and calibration.

3.4.7. The highway model calibration and validation process was undertaken successfully and has produced a reasonable standard and quality of results for all time periods. The robustness of the observed highway model as a forecasting tool has been measured by comparing link flows and journey times against observations. The comparisons were benchmarked against DfT TAG calibration and Validation standards.

Forecasting

3.4.8. Forecast models have been developed based on the 2015 NSTM (Northamptonshire Strategic Transport Model) Model. Models have been developed for two forecast years, 2026 and 2041. The details of the forecast year update and results are given in The Transport Model Forecast Report provided (July 2023) as an appendix to the LMVR.

Network Changes

3.4.9. The transport model was updated with network coding changes that incorporated the following modifications:

- Addition of a signalised roundabout near Brackley: To reflect the junction improvement constructed in 2019, the Do Minimum model now includes a signalised roundabout near Brackley.
- A422 Farthinghoe Bypass scheme: This scheme introduces a new single carriageway to the North of the village. It is designed to have junctions at both ends of the village. Cockley Road will pass over the bypass, and an overbridge is proposed to accommodate farm access and the bridleway.

3.4.10. The network attributes have been updated with the following attributes:

- In the Northern V0 scenario, the bypass is approximately 2.3 km long and 75 m wide at its widest point. It bypasses the village of Farthinghoe to the north, running between the A422 (around 600 m to the northwest of Limes Farm/western edge of Farthinghoe) at its western extent and A422 at Glebe Farm at its eastern extent.
- Northern V1, for the most part follow the same alignment as proposed Northern V0 from Glebe Farm to Cockley Road. After crossing Cockley Road, Northern V1 continues west on a more northernly alignment.

3.4.11. These scenarios are shown in Figure 3-2 and Figure 3-3 respectively.

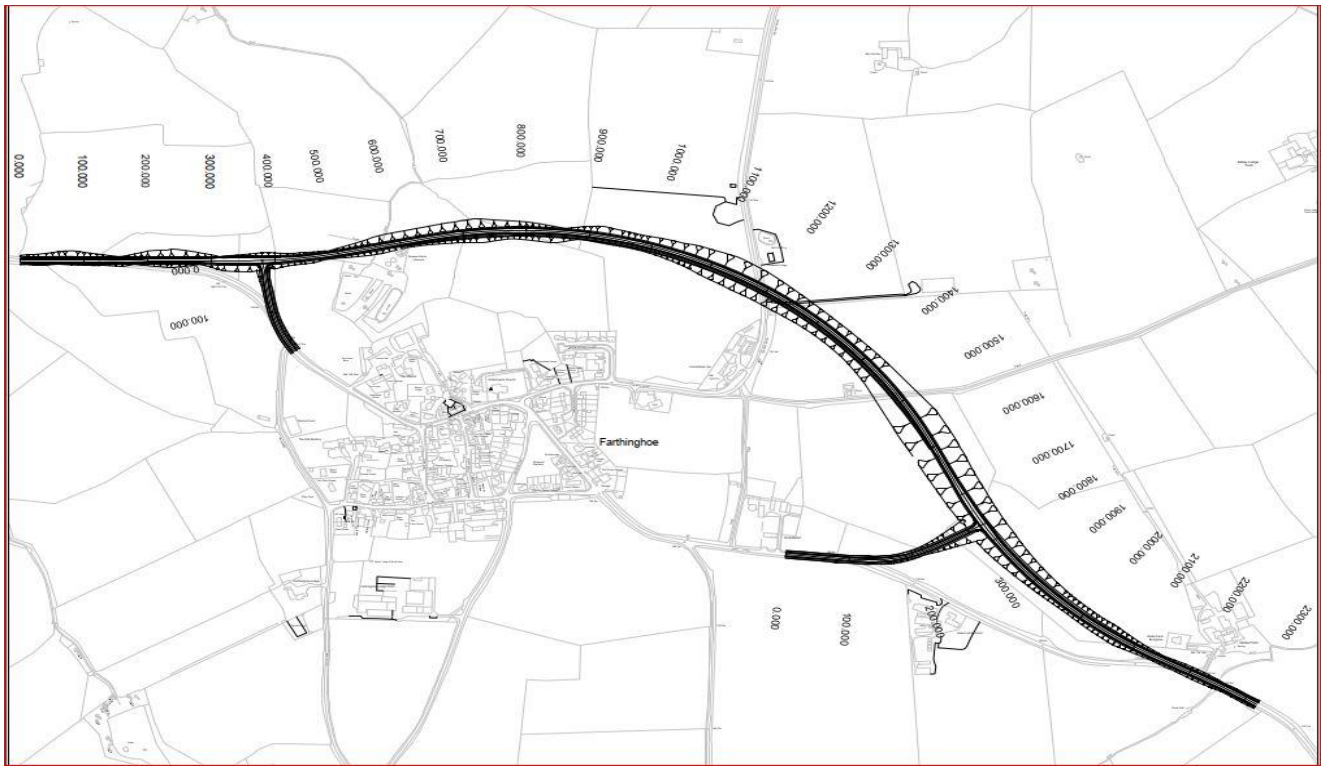


Figure 3-2 - Northern Option V0

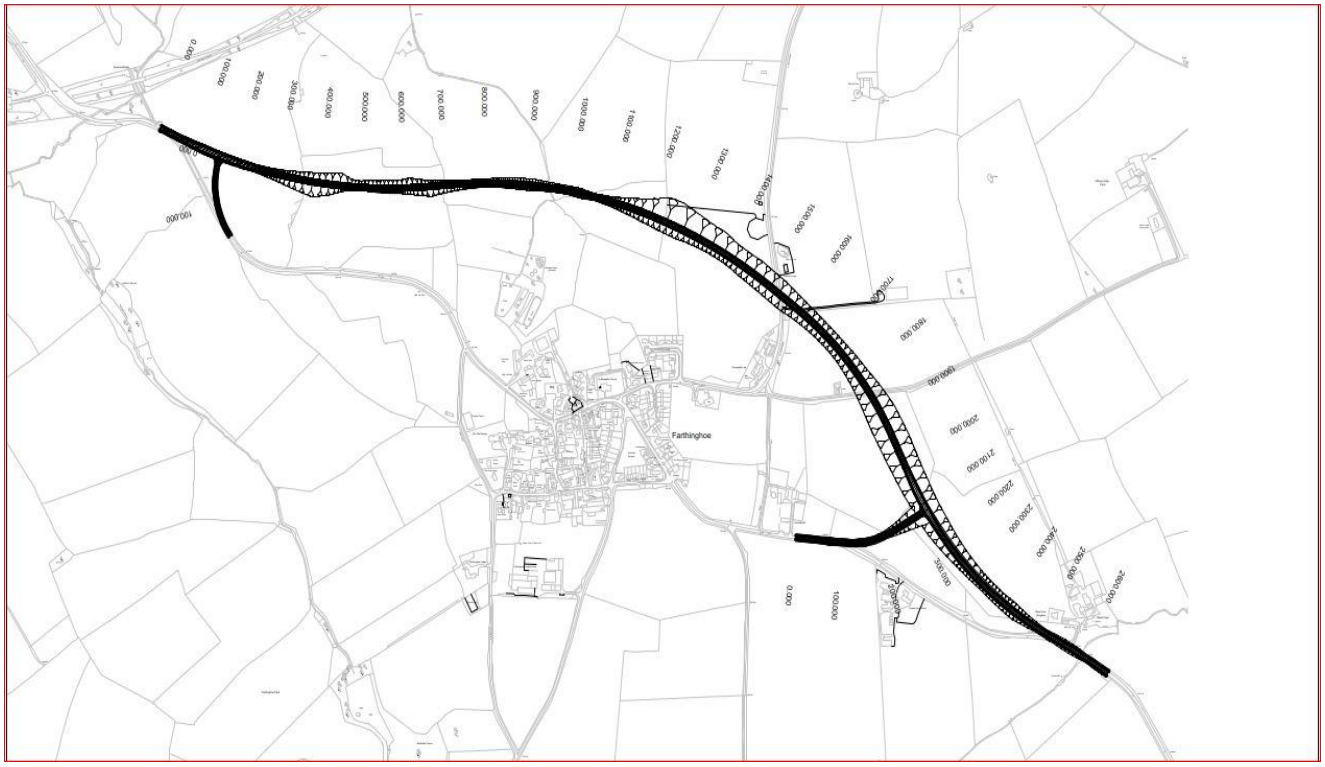


Figure 3-3: - Northern V1 Option

3.4.12. The base year matrices have been forecasted to 2026 and 2041 for AM, IP (Inter Peak) and PM peak considering the TEMPro 8.0 and NRTP 2022 growth factors with respect to the 2015 base year and additional development trips from reference NSTM V35 developer proforma.

3.4.13. For Cars, the growth factors have been determined utilizing the Tempro 8.0 data set. This dataset is employed to analyse and project the changes in car travel patterns, considering various factors such as commuting, business-related travel, and other types of car trips. For LGV and HGV, the growth factors have been derived from the National Road Traffic Projections (NRTP) 2022 dataset. The NRTP dataset provides insights into the projected traffic volumes and trends for different vehicle categories, including both LGVs and HGVs. By using these growth factors, the analysis can incorporate the expected changes in traffic volumes for various vehicle categories, helping to forecast future transportation trends and plan for infrastructure development accordingly.

Core Scenario

3.4.14. A Core Scenario has been defined to test the scheme, this represents the most unbiased and realistic set of assumptions and is therefore considered the central case for appraisal. The Core Scenario is defined by the certainty given to demand and supply assumptions as documented in the uncertainty log. For appraisal purposes there needs to be at least two options considered under the Core Scenario. These are derived from the uncertainty log and are reported as the Do Minimum ("without scheme") and the Do Something ("with scheme").

3.5 COSTS

3.5.1. The cost of the scheme has been estimated at 2023 Q2 prices, as set out in the Financial Case. It includes all costs associated with scheme preparation and construction, including land costs.

3.5.2. The costs have been calculated in line with TAG A1.2 Scheme Costs (May 2022), which uses the following methodology:

- Estimation of a base cost estimate
- Incorporation of a real cost increases
- Application of risk-cost adjustment
- Application of optimism bias-cost adjustment
- Rebase cost to Department base year
- Discount cost to Department base year
- Convert costs to market prices

3.5.3. Costs have been estimated for Investment costs (scheme preparation and construction) only.

ESTIMATION OF BASE COST ESTIMATES

3.5.4. The initial capital cost estimate of the scheme is **£19.7 million** for Option V0 and **£24.3 million** for Option V1 in 2022 Q2 prices. This includes costs for construction, statutory undertakers work, land and other costs such as professional fees.

3.5.5. In line with TAG Unit A1.2 (Scheme Costs), sunk costs have not been included in the following tables as these are costs that represent expenditure prior to the economic appraisal, and cannot be retrieved apart from land costs.

3.5.6. Currently no estimation has been made for land purchase or compensation costs. As the scheme progresses and the scheme design is further developed information regards land and compensation costs can be determined.

Table 3-1 - Investment Costs, £000s at 2022 Q2

Investment costs	Option V0 Total Cost (£000s)	Option V1 Total Cost (£000s)
Direct Construction Costs	12,914	15,888
Indirect Construction Costs (Fees, Prelims, preparation & supervision)	6,824	8,395
Land	0	0
Total Cost	**19,738**	**24,284**

3.5.7. This base cost estimate does not take account of real increases in costs and must therefore be adjusted to provide real costs that account for the effects of inflation.

INFLATION ADJUSTMENT

3.5.8. The costs in the financial case include inflation calculated using the Building Cost Infrastructure Service Tender Price Index (BCIS TPI) with a value of 14.25%. This comes in at £1.84 million (V0) and £2.26 million (V1) giving an outturn cost of £21.58 million (V0) and £26,55 million (V1) without risk.

SCHEME MAINTENANCE AND RENEWAL COSTS

3.5.9. The whole life costs of the scheme have not been estimated. Maintenance and renewal costs will be included at the next stage as the scheme progresses.

INCORPORATION OF REAL COST INCREASES

3.5.10. The first step of cost adjustment is to incorporate real cost increases. A real cost adjustment is calculated by inflating base costs by the construction cost index to bring them to their nominal values, and then dividing by the rate of general inflation to give their ‘real’ value. For this calculation general inflation has been taken from the most current TAG Databook, while construction costs are calculated from the BCIS TPI for year on year increases. Using the real cost adjustment to multiply by the initial base estimate derives a ‘real’ capital cost estimate. From 2028 onwards both the annual growth and BCIS TPI are at 2%.

3.5.11. Only the general inflation rate has been applied to the maintenance and renewals costs. Therefore, it assumes zero real cost inflation over the appraisal period.

Table 3-2 - Real adjusted Costs (£000s)

Costs (£000s)	2024/25	2025/26	2026/27	2027/28	Total
Real Adjustment Factor	1.00	1.02	1.02	1.02	
Investment Cost w/Real adjustment V0	2,040	7,959	8,228	2,180	**20,406**
Investment Cost w/Real adjustment V1	2,514	9,792	10,122	2,681	**25,110**

APPLICATION OF RISK-COST ADJUSTMENT

3.5.12. Once the base cost estimate has been adjusted to incorporate real cost increases, the risk contribution is calculated. A Quantified Risk Assessment (QRA) of scheme investment costs has not been undertaken. The risk has been calculated using an allowance of 46%. A QRA will be undertaken at the next appraisal stage for the scheme. It is not appropriate to undertake a QRA at this stage as the scheme is not sufficiently developed.

3.5.13. As noted in the Financial Case, the total quantified risk value added to the scheme base costs is £9.926 million (V0) and £12,212 at 2022 Q2 prices. This equates to approximately 50% of base costs.

Table 3-3 – Risk adjusted Costs (£000s)

Costs (£000s)	2024/25	2025/26	2026/27	2027/28	Total
Total risk adjusted costs with real cost adjustment V0	3,061	11,938	12,341	3,269	**30,610**
Total risk adjusted costs with real cost adjustment V1	3,772	14,688	15,184	4,022	**37,665**

OPTIMISM BIAS (OB)

In line with the guidance in TAG Unit A1.2, an optimism bias (OB) uplift to scheme costs, which is necessary to counter the systematic tendency of appraisers to be overly optimistic (and underestimate scheme costs) has been applied. The recommended optimism bias uplifts for each stage of a transport project and type of scheme for Local Authority schemes are set out in Table 3-4.

Table 3-4 - Recommended Optimism Bias uplifts

Stage Category	Type of Project	Stage 1 Strategic Outline Business Case	Stage 2 Outline Business Case	Stage 3 Full Business Case
Road	Motorway, Trunk roads, local roads	46%	23%	20%

Source: TAG Unit A1.2, Scheme Costs, Table 8

3.5.14. As we are at stage 1 and are producing a Strategic Outline Case, and the scheme is classed as a road intervention, optimism bias has been applied at 46% of the scheme.

Table 3-5 - Costs adjusted for Optimism Bias

Costs (£000s)	2024/25	2025/26	2026/27	2027/28	Total
Public investment costs with 46% optimism bias V0	2,979	11,620	12,012	3,182	**29,793**
Public investment costs with 46% optimism bias V1	3,671	14,296	14,779	3,915	**36,661**

RECONCILING QRA AND OB COST ESTIMATES

3.5.15. Comparing the risk estimate cost with the OB cost shows that the OB costs are slightly less than the risk estimate. The OB allows for unknown unknowns, the risk is based on an allowance of 50% of scheme costs. As the difference is slight the OB estimate is chosen to fully reflect the potential risks of the A422 Farthinghoe Bypass.

REBASE COST TO DFT BASE YEAR

3.5.16. For appraisal purposes, all costs should be presented in the DfT's base year, 2010. Costs are deflated to the correct price base by multiplying them by the ratio of the inflation index in the desired base year to the inflation index in the year currently being used.

3.5.17. Costs have been adjusted to 2010 prices using TAG data book (v1.21 May 2023) values as set out in Table 3-7.

Table 3-6 - Adjustment to 2010 prices

	2010	2022	Factor
GDP Deflator	100	129.56	0.77

Table 3-7 - Rebased Costs to 2010 Prices

Costs (£000s)	2024/25	2025/26	2026/27	2027/28	Total
OB adjusted costs at 2010 prices V0	2,299	8,969	9,272	2,456	**22,996**
OB adjusted costs at 2010 prices V1	2,833	11,034	11,407	3,022	**28,297**

DISCOUNT COST TO DFT BASE YEAR

3.5.18. A discount factor based on the HM Treasury "Green Book" is applied, to adjust costs occurring in different periods to a standard base year of 2010. An annual discount rate of 3.5% was applied for the first 30 years and 3% for years 31 to 60. This reflects the lower weighting placed on costs (and benefits) incurred at a future date compared to those incurred in the present.

Table 3-8 - Scheme Costs Discounted to 2010 Present Value

Costs (£000s)	2024/25	2025/26	2026/27	2027/28	Total
Discount factor	0.618	0.597	0.577	0.557	
Discounted OB adjusted costs at 2010 prices V0	1,420	5,353	5,347	1,369	**13,489**
Discounted OB adjusted costs at 2010 prices V1	1,750	6.586	6,578	1,684	**16,599**

CONVERT COSTS TO MARKET PRICES

3.5.19. The last stage in preparing costs for appraisal is to convert them from the factor cost to the market price unit of account. This is done by using the indirect tax correction factor of 1.190, as per the TAG Data Book.

3.5.20. In line with TAG Unit A1.2 (Scheme Costs), the Present Value of Costs (PVC) only includes investment and operating costs incurred by the public sector. Private sector contributions to the scheme costs are not included in the PVC but are recorded as negative values in the Transport Economic Efficiency (TEE) table and Present Value of Benefits (PVB).

3.5.21. The Present Value of Costs (PVC) is presented in Table 3-9

Table 3-9 - Present Value of Costs £(000s)

Risk adjusted costs in £	Scheme Preparation and Construction Cost V0	Scheme Preparation and Construction Cost V1
Public Sector Investment costs	19,738	24,284
Public investment costs with 46% optimism bias	29,793	36,661
Public investment costs with deflation & discounting	13,489	16,599
PVC with Market Price Adjustment - Public sector costs only	**16,052**	**19,753**

3.5.22. The total discounted Present Value of Costs (PVC) is £16.05 million (V0) and £19.75 million (V1)

PUBLIC ACCOUNTS TABLES

3.5.23. A summary of the Public Accounts Table is shown in Table 3-10. The apportionment of costs between local and central government is discussed in the Financial Case.

Table 3-10 – A422 Farthinghoe Bypass Public Accounts Table

	Total V0 (£000s)	Total V1 (£000s)
Local Government Funding		
Revenue		
Operating Costs		
Investment Costs	2,408	2,963
Developer and Other Contributions		
Grant/Subsidy Payments		
Net Impact	**2,408**	**2,963**
Central Government Funding: Transport		
Revenue		
Operating Costs		
Investment Costs	13,645	16,790
Developer and Other Contributions		
Grant/Subsidy Payments		
Net Impact	**13,645**	**16,790**
Central Government Funding: Non-Transport		
Indirect Tax Revenues	969	716
Broad Transport Budget	**16,052**	**19,753**
Wider Public Finances	**969**	**716**

3.6 APPRAISAL OF SCHEME IMPACTS

ASSUMPTIONS

3.6.1. Table 3-11 sets out the assumptions used in the Transport Users Benefits Appraisal (TUBA) and COBALT appraisals.

Table 3-11 - TEE TUBA/COBALT assumptions

Item	Assumptions/Notes
Software	TUBA version 1.9.17.2 COBALT version 2.4.0.0
Current year	2023

Item	Assumptions/Notes
Appraisal period / Horizon year	60 years / 2085
Forecast year trip, time and distance matrices from traffic model	2026, 2041
User classes	Trip, time and distance matrices for the following user classes will be input into TUBA: Cars used for Employers Business Cars used for Commuting Cars used for Other purposes Light Goods Vehicles (LGVs) HGVs
Economic Parameters	Economics_TAG_db1_20_2
PCU Factor	1 for Cars and LGVs, 2.3 for HGVs
Annualisation factors for modelled time periods (AM, IP, PM weekday)	AM 742, Inter-peak 1,518, PM 719

SCHEME IMPACTS

3.6.2. Economic Impacts cover the Transport Economic Efficiency, Reliability and Wider Economic Impacts.

3.6.3. Environmental Impacts have been assessed for the noise and Air quality and Greenhouse gases environmental categories.

3.7 LEVEL 1 IMPACTS

TRANSPORT ECONOMIC EFFICIENCY (TEE)

3.7.1. TEE benefits for the scheme were assessed using the DfT's TUBA software. TUBA calculates the benefits associated with journey time savings and vehicle operating cost savings using information taken from the traffic model, in accordance with the procedures and economic parameters in TAG Unit A1.

3.7.2. The transport user benefits for the DS scenario relative to the DM scenario have been assessed using TUBA v1.9.17.2 with the standard TUBA 20-2 economics file. Transport user impacts as forecast by TUBA are shown in **Table 3-12** for Option V0 and for Option V1.

3.7.3. The TEE impacts for the A442 Farthinghoe Bypass £16.89 million for option V0 and £19.76 million for option V1.

Table 3-12 - TEE Impacts (TUBA Results) – both options

Benefit	Option V0	Option V1
Present Value of Transport Economic Efficiency Benefits (TEE)	**16,886**	**19,763**

Results ('£000's, 2010 prices discounted to 2010)

ACCIDENTS

3.7.4. COBALT (COst and Benefit to Accidents – Light Touch) V2.4 (January 2023) has been used to understand the likely impact of the scheme on accidents in the study area. The impacts on users and road safety (accidents) have been appraised for a period of 60 years from the first year of scheme opening.

3.7.5. The scheme input file has been created containing details of all junctions and links in the study network, along with traffic flows in the base, opening and design years. The traffic flow information was derived from the current NSTM traffic model developed to assess the scheme. And local accident data (2015-2019) was used for the links rather than the default data.

3.7.6. For Option V0 the results indicate that the scheme will result in an increase of 3 accidents over the 60-year appraisal period, leading to an increase of 12 casualties (1 Fatal, 4 Serious and 7 Slight) and a cost impact of -£1.1m.

3.7.7. For Option V1 the results indicate that the scheme will result in a decrease of 7 accidents over the 60-year appraisal period, leading to a reduction of 3 casualties (1 Fatal (increase), 3 Serious (increase) and 7 Slight (reduction) and a cost impact of -£0.5m.

3.7.8. The proposed scheme options (V0 and V1) have shown a concerning trend in terms of accident disbenefits, particularly due to the increase in speed limit on the proposed bypass scheme compared to the existing A422 route. The analysis indicates that the introduction of the higher speed limit on the bypass scheme has led to an induced traffic effect, with a notable shift of traffic from the A422 to the bypass. Unfortunately, this shift in traffic has resulted in an increase in overall casualties, including fatal incidents, on the proposed bypass scheme in the COBALT assessment. The combination of the higher speed limit and the increased traffic volume on the bypass has led to elevated accident rates, which has ultimately contributed to the observed increase in fatal casualties and associated disbenefits. This finding underscores the need for a comprehensive and thorough evaluation of the proposed scheme options, taking into account not only traffic flow improvements but also their potential impact on road safety and accident rates. It is crucial to carefully consider these factors in the decision-making process to ensure the chosen scheme prioritizes the safety and well-being of all road users.

NOISE

3.7.9. A noise appraisal has been conducted for the A422 Farthinghoe bypass based on Tag Unit A3. The full appraisal is reported in the Noise Economic Appraisal note attached as Appendix B. The appraisal is summarised in the following paragraphs.

3.7.10. The study area has been defined as area approximately 600m around Farthinghoe village and the bypass options, in line with Design Manual for Roads and Bridges (DMRB) LA111. The assessment has been used the following model outputs:

- Do-Minimum Opening Year (DMOY) – scenario without the scheme in 2027
- Do-Minimum Opening Year (DMFY) – scenario without the scheme in 2041
- Northern V0 Do-Something Opening Year (DSOY) – scenario with the scheme in 2027
- Northern V0 Do-Something Future Year (DSFY) – scenario with the scheme in 2041
- Northern V1 Do-Something Opening Year (DSOY) – scenario with the scheme in 2027
- Northern V1 Do-Something Future Year (DSFY) – scenario with the scheme in 2041

3.7.11. A noise model was developed which incorporates a number of data sources and ais configured to calculate in accordance with DMRB and Calculation of Road Traffic Noise (CRTN). In line with CRTN, only roads with an AAWT,18h (06:00 – 00:00) vehicle flow of equal to or greater than 1,000 vehicles are calculated in the noise model.

3.7.12. Both the Northern V0 and Northern V1 bypass alignments result in net benefit noise changes (i.e. net reduction in road traffic noise). A reduction in noise results in a positive monetary valuation for both bypass alignments. The TAG Unit A3 monetary valuation of noise changes are presented in Table 3-13.

Table 3-13 – Noise Impacts - Monetary valuation of changes in noise impact

Benefit	Option V0	Option V1
Net present value of change in noise	**1,724**	**1,581**
Net present value of impact on sleep disturbance	752	569
Net present value of impact on amenity	666	694
Net present value of impact on acute myocardial infarction	121	123
Net present value of impact on stroke	74	77
Net present value of impact on dementia	112	117

Results (’£000’s, 2010 prices discounted to 2010)

3.7.13. A relatively small number of residential properties experience an increase in daytime and night-time noise levels. The changes forecast are set out in Table 3-14.

Table 3-14 – Noise Impacts – Estimation of households affected

Benefit	Option V0	Option V1
Households experiencing **increased daytime** noise in forecast year	16	13
Households experiencing **reduced daytime** noise in forecast year	131	131
Households experiencing **increased night-time** noise in forecast year	7	1
Households experiencing **reduced night-time** noise in forecast year	81	69

3.7.14. Noise Important Areas (NIA) are locations that the Department for the Environment and Rural Affairs (Defra) has identified as containing the 1% of the population that are affected by the highest noise levels. These areas are identified in accordance with the requirements of the EU Environmental Noise Directive and associated English Regulations. NIAs are areas which require potential action to reduce noise levels.

3.7.15. There are three NIAs within the study area:

- NIA 8153 located in the centre of Farthinghoe village along Main Road, there are approximately 65 properties in this area.
- NIA 8152 located east of Farthinghoe village on Main Road, there is a single property in this area.
- NIA 8151 located at the eastern edge of the study area on Main Road, there is a single property in this area.

3.7.16. The traffic data shows that the introduction of the bypass will reduce the number of vehicles travelling through Farthinghoe village along Main Road (A422), this results in lower noise levels along this route. As the properties in Defra NIA 8153 lie along Main Road, these properties experience a reduction in noise levels.

AIR QUALITY

3.7.17. The air quality appraisal has been undertaken in accordance with TAG Unit A3. The full appraisal is reported in the Air Quality Appraisal note attached as Appendix C. The appraisal is summarised in the following paragraphs.

3.7.18. This guidance defines the approach for appraising local air quality based on quantification of the change in concentration of the traffic-related pollutants Nitrogen Dioxide (NO2) and particulate matter with a diameter of less than 2.5 micrometres (PM2.5) at identified sensitive receptors (e.g. residential properties, schools) within 200m of the affected road network associated with the Proposed Scheme.

3.7.19. The study area for the air quality appraisal screening was defined based on DMRB LA 105 guidance:

- Road re-alignment of 5m or more
- Daily traffic flows will change by 1,000 AADT
- Heavy Duty Vehicle (HDV) flows will change by 200 AADT or more
- A change in speed band or
- Daily average speed change of 10km/h or more.

3.7.20. In total, there are 166 sensitive receptor locations identified in the air quality study area, comprising 1 primary school and 165 residential dwellings.

Traffic flows were provided for the following scenarios:

- Baseline 2019 – for model verification;
- ‘Do Minimum’ (DM) 2027 – Opening year without the Proposed Scheme in place
- ‘Do Something’ Option 1 (DS1) 2027 – Opening year with the Proposed Scheme (Option 1) in place
- ‘Do Something’ Option 2 (DS2) 2027 – Opening year with the Proposed Scheme (Option 2) in place
- Do Minimum’ (DM) 2041 – Design year without the Proposed Scheme in place

- ‘Do Something’ Option 1 (DS1) 2041 – Design year with the Proposed Scheme (Option 1) in place
- ‘Do Something’ Option 2 (DS2) 2041 – Design year with the Proposed Scheme (Option 2) in place.

Option V0

3.7.21. The local air quality assessment has been undertaken and the analysis indicates that there is an overall improvement in local ambient air quality with respect to NO2 and PM2.5 as a result of the Proposed Scheme in the opening and design years.

3.7.22. No exceedances of NO2, PM10 or PM2.5 are predicted in either the opening year or design year with or without the Proposed Scheme in place. In both the opening and design year, most of the properties in the study area are predicted to experience an improvement in pollutant concentrations.

3.7.23. The local air quality assessment has been undertaken and analysis indicated that there is an overall improvement in local air quality with respect to NO2 and PM2.5 across the study area as a result of the Proposed Scheme.

3.7.24. In the opening year for NO2 a net total score of -191.76 is predicted. For PM2.5, a net total score of -30.65 is predicted. Both of these reflect an improvement in air quality with regard to local concentrations of the respective pollutant in the opening year.

3.7.25. In the design year, for NO2 a net total score of -131.23 is predicted. For PM2.5, a net total score of -30.72 is predicted. Both of these reflect an improvement in air quality with regard to local concentrations of the respective pollutant in the opening year.

3.7.26. The total value of change in air quality is monetised at £151,166, indicating a net benefit with regards to air quality. The change in localised NO2 concentrations leads to a benefit of £55,729, approximately 37% of the total value of change in air quality. The change in localised PM2.5 concentrations leads to a benefit of £95,437, approximately 63% of the total value of change in air quality.

Option V1

3.7.27. The local air quality assessment has been undertaken and the analysis indicates that there is an overall improvement in local ambient air quality with respect to NO2 and PM2.5 as a result of the Proposed Scheme in the opening and design years.

3.7.28. No exceedances of NO2, PM10 or PM2.5 are predicted in either the opening year or design year with or without the Proposed Scheme in place. In both the opening and design year, most of the properties in the study area are predicted to experience an improvement in pollutant concentrations.

3.7.29. The local air quality assessment has been undertaken and analysis indicated that there is an overall improvement in local air quality with respect to NO2 and PM2.5 across the study area as a result of the Proposed Scheme. In the opening year, for NO2 a net total score of -194.87 is predicted. For PM2.5, a net total score of -31.33 is predicted. Both of these reflect an improvement in air quality with regard to local concentrations of the respective pollutant in the opening year.

3.7.30. In the design year, for NO2 a net total score of -133.45 is predicted. For PM2.5, a net total score of -31.37 is predicted. Both of these reflect an improvement in air quality with regard to local concentrations of the respective pollutant in the opening year.

3.7.31. The total value of change in air quality is monetised at £154,136, indicating a net benefit with regards to air quality. The change in localised NO2 concentrations leads to a benefit of £56,662, approximately 37% of the total value of change in air quality. The change in localised PM2.5 concentrations leads to a benefit of £97,474, approximately 63% of the total value of change in air quality.

3.8 INITIAL BENEFIT COST RATIO (BCR)

3.8.1. The BCR considers the impact to the economy, society, the environment and the public accounts. It offers an estimate of the value of benefit generated for every £1 of public expenditure. Therefore, any BCR above one shows value for money for every £1 of invested cost. The Value for Money (VfM) category is defined by the BCR, these are:

- BCR <0.0 Very Poor
- BCR between 0.0 and 1.0 Poor
- BCR between 1.0 and 1.5 Low
- BCR between 1.5 and 2.0 Medium
- BCR between 2.0 and 4.0 High
- BCR > 4.0 Very High

3.8.2. The initial BCR includes the monetised impacts associated with Economy for business users and providers, Environment for Greenhouse Gases, Air Quality and Noise, Social for non-business users, physical activity and safety, and Public Accounts for the cost to the broad transport budget and indirect tax. **Table 3-15** shows the Initial Analysis of Monetised Costs and Benefits (AMCB) results and the Initial BCR associated with the scheme.

Table 3-15 – Analysis of Monetised Costs and Benefits – Initial £(000s)

	Option V0	Option V1
Noise	1,724	1,581
Air Quality	151	154
Greenhouse Gases (TUBA assessment)	973	971
Accidents/Safety	-1,108	-540
Economic Efficiency:	**16,886**	**19,763**
Wider Public Finances (Indirect Taxes)	-969	-716
Initial Present Value of Benefits (PVB)	**17,657**	**21,213**
Present Value of Costs (PVC)	**16,052**	**19,753**
Net Present Value (NPV)	1,605	1,460
Benefit Cost Ratio (BCR)	**1.10**	**1.07**

£000s 2010 prices, discounted to 2010

3.8.3. Therefore, based on the scheme impacts and costs the scheme has an initial VfM Category of low for both the options.

3.8.4. No Level 2 or Level 3 impacts have been assessed for the scheme due to its current stage.

CONCLUSION

3.8.5. In its current format the A422 Farthinghoe Bypass scheme is not currently economically viable with a VfM category of low. No funding has as yet been identified for the scheme.

4 FINANCIAL CASE/DIMENSION

4.1 INTRODUCTION TO AFFORDABILITY

4.1.1. The Financial Case outlines the proposed financing of the scheme in terms of the affordability of the proposal, the source of funding, annual breakdown of provisions and outturn costs. This section considers the potential costs and associated financial case for the preferred scheme and describes:

- How much the scheme is expected to cost, and how this has been calculated
- The anticipated profile of expenditure (including whole life costs)
- Risks that could affect the cost of the scheme
- How the scheme will be paid for, and by whom

4.2 COSTS

4.2.1. Scheme costs have been developed for the A422 Farthinghoe northern bypass options V0 and V1 in line with TAG A1.2.

4.2.2. The cost estimate has a price base of 2022 Q2 (taken from Spons. The cost estimate has been developed using Bills of Quantities based on the latest design drawings. The estimated cost of the scheme at out-turn prices excluding VAT is £31.50 million for V0 and £38.76 million for V1. The estimated cost of the scheme is shown in Table 4-1.

SCHEME PREPARATION AND CONSTRUCTION

4.2.3. The cost of scheme preparation and construction has been estimated by WSP Quantity Surveyors working alongside design technical specialists.

Table 4-1 - Breakdown of Scheme Costs (£000)

Scheme element	Option V0	Option V1
Direct Construction Costs	12,914	15,888
Indirect Construction Costs (Fees, Prelims, preparation & supervision)	6,824	8,395
Land	0	0
Total Cost (excluding risk)	**19,738**	**24,284**
Risk	9,926	12,212
Total Cost at 2023 Q2 Prices	**29,664**	**36,496**
Adjustment to outturn (inflation)	1,840	2,264
Scheme Cost (outturn prices)	**31,504**	**38,759**

SPEND PROFILE

4.2.4. The assumed annual profile of expenditure is shown in Table 4-2. This is based on an estimate of when work is likely to commence and will be developed further as the scheme design progresses.

Table 4-2 - Annual Spend Profile %

Scheme Element	26/27	27/28	28/29	29/30	Total
Direct Construction Costs	0	45	45	10	100
Indirect Construction Costs	30	30	30	10	100
Risk	10	40	40	10	100
Inflation	0	45	45	10	100

RISK ALLOWANCE

Estimating uncertainty

4.2.5. The final cost of delivering the schemes will not be known until after completion of the detailed design and land purchase, and completion of the statutory process. For this reason, the scheme cost estimates include allowances to account for this uncertainty, or risk. During the project lifecycle, the risk associated with cost estimates is determined by the level of detailed knowledge at each respective stage. As the level of detail increases, the level of risk, and the risk-adjusted costs usually reduce.

4.2.6. An allowance for risk has been included in the cost estimate of 46%, £9.93 million for option V0 and £12.21 million for option V1

4.3 BUDGETS AND FUNDING COVER

4.3.1. It is anticipated that the scheme will be funded entirely from public finances. No funding solution has yet been identified for the project. It should be noted that central government funding requires local or third-party contribution, which is normally set at a % of the total scheme costs. For MRN and LLM the local government contribution required was a minimum of 15%. This has been assumed as the funding split for the A422 Farthinghoe Bypass.

4.3.2. The indicative proposed funding breakdown for the scheme is detailed in Table 4-3 for Option V0 and Table 4-4 for Option V1. This assumes a maximum central government funding contribution of 85%.

4.3.3. The exact composition of the local authority contribution has not yet been finalised, but it is expected to come from a combination of different resources such as developer contributions through S106 agreements or other such mechanisms.

Table 4-3 – Funding Profile Option V0 (£000)

	26/27	27/28	28/29	29/30	Total
Central Government	2,615	10,743	10,743	2,678	**26,778**
Local Government	461	1,896	1,896	473	**4,726**
Total	**3,077**	**12,638**	**12,638**	**3,150**	**31,504**

Table 4-4 – Funding Profile Option V1 (£000)

	26/27	27/28	28/29	29/30	Total
Local Government	568	2,332	2,332	581	**5,814**

5 COMMERCIAL CASE/DIMENSION

5.1 INTRODUCTION

5.1.1. The Commercial Case provides evidence of the commercial viability of the proposed scheme and describes the procurement strategy that will be used to engage the market. It provides evidence on the approach to risk allocation and transfer, contract and implementation timescales and the approach to managing the contract.

5.1.2. Risk allocation is based on guidance contained within the Outsourcing Playbook[1], with a clear delineation between the contractor's and client's risk ownership. Additional detail on WNC's approach to risk management can be found in **Section 6** the Management Case.

5.1.3. This chapter outlines the current understanding of the proposed commercial requirements including:

- Output Based Specification
- Procurement Strategy
- Sourcing Options
- Payment Mechanisms
- Pricing Framework and Charging Mechanisms
- Potential for Risk Transfer
- Contract Length
- Contract Management
- Resourcing issues

5.1.4. It is important to note that two new unitary authorities (West Northamptonshire and North Northamptonshire) have replaced the County and District Councils in Northamptonshire from April 2021. Therefore, the new West Northamptonshire Council is responsible for the procurement of the A422 Farthinghoe Bypass scheme.

5.2 OUTPUT BASED SPECIFICATION

5.2.1. The outcomes of the procurement strategy must include certainty that the scheme can be delivered within the available funding constraints and that further preparation costs are minimised whilst ensuring the appropriate quality is maintained.

5.2.2. Contractors should input to the construction programme, risk management and mitigation measures at the earliest available opportunity to ensure that the management of the scheme is achievable, and risk is minimised.

5.2.3. The output-based specification for the scheme has yet to be developed in line with the need to secure funding approval for the preferred scheme prior to undertaking this significant piece of work.

[1] The Outsourcing Playbook, Central Government Guidance on Service Delivery, including Outsourcing, Insourcing, Mixed Economy Sourcing and Contracting, version 2.0, June 2020

5.3 PROCUREMENT STRATEGY

5.3.1. West Northamptonshire Council (previously Northamptonshire County Council) has extensive experience procuring complex highway engineering projects. These schemes have created the foundation for A422 Farthinghoe Bypass's procurement strategy.

FORM OF CONTRACT

5.3.2. For civil engineering works in the UK, there are two main forms of contract: the Infrastructure Conditions of Contract (ICC); or the New Engineering and Construction Contract NEC suite of contracts. These two options are discussed in more detail as follows.

Infrastructure Conditions of Contract (ICC)

5.3.3. The Infrastructure Conditions of Contract (ICC) suite of contracts is one of the main forms of standard contracts for UK civil engineering and infrastructure work. ICC provides a clear and standardised contract specifically tailored for civil engineering and infrastructure projects. It is endorsed by the sponsoring bodies, Association for Consultancy and Engineering and the Civil Engineering Contractors Association.

5.3.4. Separate versions of the ICC Conditions of Contract cater for a variety of types of contract strategy including measurement, target cost and design and construction. The different conditions provide options for delivery with each offering a comprehensive and clear set of conditions with clear risk allocation between Employer and Contractor. The contract is administered by an independent engineer.

5.3.5. The procedures set out in the Contract provide a cooperative form of contract that aim to prevent or reduce delays and allow control of costs at any stage of a Contract.

NEC Engineering and Construction Contract

5.3.6. The NEC Engineering and Construction Contract suite of contracts, originally known as New Engineering Contract, has been used to deliver building and engineering schemes globally since its first publication in 1993. The NEC suite uses plain language and promotes good communication and management to deliver projects.

5.3.7. The NEC offers five Conditions of Contract options for delivery of engineering projects, including priced, target cost and cost reimbursable contracts. The different conditions, based around common core clauses, seek to allocate risk management to the appropriate party and promote non-adversarial working. The Contract is administered by an appointed Project Manager.

5.3.8. The NEC suite encourages a collaborative approach to deliver schemes and promotes proactive management of risks to deliver schemes on programme and budget.

CONTRACT STRATEGY

5.3.9. The contract strategy considers which contractual mechanism aligns best with the procurement objectives. The NEC Engineering and Construction Contract suite offers seven main conditions of contract options for scheme delivery. They all stimulate best practice management and encourage relationships between the two parties to the contract and hence the work involved in the contract.

- Option A: Priced contract with activity schedule
- Option B: Priced contract with bill of quantities
- Option C: Target cost with activity schedule

- Option D: Target cost with bill of quantities
- Option E: Cost reimbursable
- Option F: Management contract
- Option G: Term Contract

5.3.10. Option F & G are not suitable for the Construction of the A422 Farthinghoe Bypass.

5.3.11. **Option A** is a priced contract with an activity schedule where the risk of carrying out the work at the agreed price is largely borne by the contractor. Contractors tender for an Option A contract based on lump sum prices for each activity based on their own assessment of the requirements of the activities.

5.3.12. **Option B** is a priced contract with a bill of quantities where the risk of carrying out the work at the agreed prices is largely borne by the contractor. Contractors tender for an Option B contract by completing a bill of quantities prepared by the employer. The quantities required to complete the bypass works are therefore specified by NNC, and NNC would bear the risk of the quantities being wrong.

5.3.13. **Option C** is a target cost contract with an activity schedule where the out-turn financial risks are shared between the client and the contractor in an agreed proportion. Contractors tender a target price based on a list of activities which is then adjusted through the delivery to reflect agreed changes. The contractor is then paid for completed works and a percentage of any savings made during the delivery or the amount paid is reduced by a percentage of any over-spend.

5.3.14. **Option D** is a target cost contract with a bill of quantities where the out-turn financial risks are shared between the client and the contractor in an agreed proportion. Contractors tender and are paid similarly to Option C, but based on a bill of quantities rather that an activity schedule.

5.3.15. **Option E** is a cost reimbursable type contract where the financial risk is taken largely by the client. Under Option E the contractor is paid for works completed plus a fee.

5.3.16. The Options, A to E, offer varying levels of risk exposure, incentivisation and flexibility depending on the procurement objectives and the level of design undertaken prior to tender.

5.3.17. **Figure 5-1** summarises the characteristics of the different NEC Options:

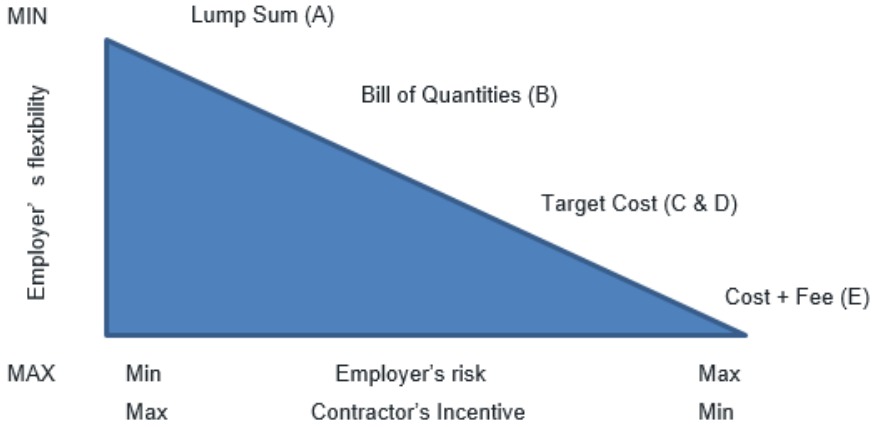


Figure 5-1 - Comparison of NEC Options

5.3.18. The fixed-price contracts offered by Options A and B require a high degree of design maturity. Option A and, to a lesser extent, Option B minimise WNC risk exposure following contract award

and incentivise the contractor to deliver the bypass in the most efficient manner. This results in increased cost and programme certainty. As a high degree of design fixity is assumed at the point of tendering, scope for post-award amendment to the scheme is limited. Option A minimises risk exposure more than Option B, both options have been discounted.

5.3.19. A target cost contract strategy, through Option C or D, provides a more balanced allocation of risk between the client and contractor, and incentivises both parties to work together to achieve an efficient delivery. In practice, target cost contracts are usually tendered with activity schedules, Option C, rather than with a bill of quantities, Options D. This is because the contract strategy looks to take programme benefit from the reduced need for design maturity, and the contractor's input into the final scheme proposals.

5.3.20. The cost reimbursable strategy offered by Option E places maximum risk with WNC and little incentive for the contractor to deliver works efficiently. A cost reimbursable contract would not generally be considered an appropriate delivery strategy for the main contract works of a large civil engineering infrastructure scheme.

TYPE OF CONTRACT

5.3.21. There are a few contract options available, these are:

- Traditional
- Design and Build
- Partnering with Early Contractor Involvement

5.3.22. The advantages and disadvantages of each, and the likely contract form, are summarised as follows.

Traditional

5.3.23. The programme constraint would not impact the delivery of a Traditional contract in the same way. Under a Traditional form of procurement, WNC would deliver the scheme through planning and Public Inquiry. The main works contract would therefore be tendered later in the overall programme when the scheme design is fully matured. Under the Traditional option, WNC would therefore retain design responsibility and have more control over the final scheme design. Whilst WNC retain more risk to the point of contract award, the risk of change post-contract award is significantly reduced. This leads to increased cost certainty under a Traditional model compared to the other forms of procurement leading to significant cost risk until the procurement process is completed.

5.3.24. A significant constraint is that Traditional contracts typically require certainty of detailed design input, which necessitates adequate time to provide the contractor with buildable design information prior to commencement the procurement process. Where the programme allows for pre-tendering activities to be undertaken in sequence this would extend the overall programme.

5.3.25. A traditional contract would offer the following advantages:

- Principles developed over many years and widely understood
- Client develops the specification
- Risk managed by the Client
- Client retains control and flexibility to change specification
- Award of contract on lowest price basis demonstrates Value for Money

5.3.26. The disadvantages of a traditional contract are as follows:

- Client retains risk of delivery on time and to budget
- No incentive for contractor to innovate
- No link between design and construction
- Nature of all risks are not fully realised at the point of award resulting in the potential for an increase in outturn cost and delays with completion

Design and Build

5.3.27. The advantages of a Design and Build contract include:

- Integration of design and construction leads to efficiencies in cost and time
- Single point of responsibility for the Client
- Risks clearly identified and allocated during the procurement phase
- Stimulates innovation, reducing cost
- Allows the contractor to review the buildability of the design

5.3.28. The disadvantages are as follows:

- There can be reduced competition with fewer companies interested
- Contractor takes on greater risk and prices accordingly
- Lack of flexibility to change the scope
- Quality may be overridden by cost efficiency

5.3.29. The Design and Build model requires a clearly defined brief and requirements.

5.3.30. The Design and Build model generally has a reduced design period when compared to a traditional form of procurement, as design and construction activities can overlap.

5.3.31. If engaged prior to planning, the risk is shared. If there is a need to amend the contract scope as a result of the planning process, this will need to be an instructed change by the client. If the change is required but does not change the scope, then the risk remains with the contractor.

5.3.32. Two Design and Build options therefore exist. Firstly, the contract be procured based on pre-planning requirements and the contractor's designer is able to undertake further design in parallel to the determination period. This includes the design being developed as part of the negotiation process of the competitive procedure. Secondly, the contract is tendered post-planning and the overall programme is extended to facilitate design post-planning but prior to the Public Inquiry. In both scenarios, knowledge transfer will be critical between the pre-planning designer and the contractor's team who will manage the scheme through Public Inquiry. Both scenarios would benefit from retaining the parties involved in preparing the planning application and the draft Orders through a Public Inquiry.

5.3.33. In order to pursue a Design and Build model, WNC would need to accept either the risk of change through the planning process or a possible delay to the programme.

Partnering with Early Contractor Involvement (ECI)

5.3.34. Partnering with ECI would have the following advantages:

- Collaboration between parties
- Risks are better defined than in a more traditional contract
- Opportunities to link design and construction

5.3.35. The disadvantages of ECI include:

- Many of the disadvantages of traditional procurement remain
- Difficult to get the right people involved at an early stage in the development of the project

5.3.36. The ECI model, wherein the Design and Build team can have greatest influence over the scheme proposals, is most effective when procurement is undertaken pre-planning.

5.4 SOURCING ROUTE

PROCUREMENT OPTIONS

5.4.1. Sourcing options for delivering A422 Farthinghoe Bypass have been identified. All procurement would have to be managed by WNC's Procurement Team.

Two Stage Procurement

5.4.2. If NEC is selected then a break clause would need to be used. The requirements for first stage pricing would need to be developed; the contract requirements would have to be established before pre-qualification. With a two stage, there will likely be a contractor buy in and earlier estimated forecast/budget cost.

5.4.3. Under NEC4, Option X22 provides for two stages, the details of which are set out by the client in the scope. Stage one is the pre-construction phase, with development of the scope, detailed design and agreement on price. Stage two is the construction phase, with completion of any remaining detailed design.

Single Stage Procurement

5.4.4. The design would have to be 100% complete, would have no contractor buy in, and there would be no early contractors estimate of target cost.

Procurement through Frameworks

5.4.5. Procurement through a framework would use NEC4. This would involve discussions with all framework contractors.

5.4.6. The price would be based on the scope of work required, preliminary costs and some major quantities from the scheme. The contract would be awarded to one of the contractors on the framework to deliver the work.

5.4.7. Timeframes for procurement need to be appropriately factored in. Indicative timescales are shown, for consideration and factoring into the timetables.

- • Open Tender (Regulated) - 12-15 months to contract award
- • Framework (Mini Competition) - 6-12 months to contract award
- • Framework (Direct Award) - 3-9 months to contract award

5.4.8. It is considered that direct award route would not satisfy WNC's governance process for demonstrating financial prudence via competitive tendering.

PROCUREMENT ROUTE

5.4.9. There are various forms of procurement that can be considered for the scheme, these include the use of either the FTS process or existing frameworks.

5.4.10. FTS is free to use and replaces the role of Tenders Electronic Daily, the Official Journal of the EU (OJEU/TED) for procurements in the UK.

Currently public sector tenders valued above £4,447,448 (including VAT) are required to be published on the Find a Tender Service. There are four options within this process which are:

- Open Tender
- Restricted Tender
- Competitive Dialogue
- Competitive with Negotiation

5.4.11. These are described as follows:

Open Procedure (OP)

5.4.12. This procedure allows an unlimited number of interested parties to tender against defined parameters. There are no restrictions (e.g. pre-qualification) on the parties who are permitted to tender, meaning that some parties may not be suitable to carry out the work. This procedure is straightforward and transparent but can attract a large number of potential bidders, consequently requiring a greater degree of assessment and associated resources.

Restricted Procedure (RP)

5.4.13. This is a two-stage procedure with a pre-qualification process. The first stage allows the contracting authority to set the minimum criteria relating to technical, economic and financial capabilities that the potential bidders have to satisfy. Following evaluation of the responses to the first stage a minimum of five bidders (unless fewer qualify) are invited to tender in the second stage. It is possible to do this over an accelerated timescale, referred to as an Accelerated Restricted Procedure.

Competitive Procedure with Negotiation (CDN)

5.4.14. This procedure is intended to be used where minimum requirements are able to be specified but negotiations with bidders may be needed to improve the initial tenders. The grounds for using this procedure are as follows:

- Where needs cannot be met without adaptation of readily available solutions
- Where the contract includes design or innovative solutions
- Where the requirement is complex in nature, in its legal and financial make-up or because of its risks
- Where the technical specifications cannot be established with sufficient precision
- In the case of unacceptable/irregular tenders

5.4.15. Within this procedure, bidders initially submit tenders based on the information issued by the contracting authority. The contracting authority is then able to review the tenders it has received and negotiate with the bidders, after which the tenders will be resubmitted.

5.4.16. This procedure may therefore be useful where the requirements are well developed initially, and full tender documents can be produced but it is felt that there may be advantage in retaining the ability to negotiate if there are certain aspects which bidders raise.

Competitive Dialogue (CD)

5.4.17. This procedure is appropriate for complex contracts where contracting authorities:

- Are not objectively able to define the technical means capable of satisfying their needs or objectives and/or
- Are not objectively able to specify the legal and/or financial make-up of a project

5.4.18. This is a multi-stage procedure. The first stage is a pre-qualification to select the potential bidders to participate in the dialogue. In the second stage the contracting authority enters into a dialogue with the potential bidders to identify and define the means best suited to satisfying their needs.

5.4.19. Any aspect of the contract may be discussed, including technical requirements for the works to be delivered and the commercial/contractual arrangements to be used. The dialogue may be conducted in successive phases with the remaining bidders being invited to tender. By the end of the dialogue phase the contracting authority's requirements will have been determined such that the scheme can be tendered. In the final stage, the remaining bidders from the dialogue phase are invited to tender for the scheme.

Existing Frameworks

Midlands Highway Alliance (Plus)

5.4.20. Midlands Highway Alliance Plus was formed from the merger of three regional efficiencies groups, the Midlands Highway Alliance, the Midlands Service Improvement Group and the West Midlands Highway Alliance. The merger in July 2020 means that the new Alliance has a membership of 35 local highway authorities from across the Midlands and beyond.

5.4.21. The three groups had common aims and objectives and with different strengths they complemented each other well. The key drivers from the Government Construction 2025 strategy are intrinsic to the preparation of the alliance's business plans and objectives.

5.4.22. The aim of the MHA+ (and its member organisations' motivation) is to continue to achieve high quality highways, public realm and infrastructure schemes as improved value for member organisations by combining and sharing resources. This will likely be achieved using agreed best practice, procurement and project management principles, including:

- Long-term framework agreements providing responsive procurement options
- Open book accounting through the supply chain
- Target pricing
- Incentivisation
- Performance measurement, benchmarking and continuous improvement
- Risk sharing and management
- Early contractor involvement including key members of the supply chain.

5.4.23. The programme board meets four times a year and manages the work of the five workstreams, ensuring that the aspirations outlined in the business plan are achieved and the budget is monitored. In addition to each authority, partner organisations also attend to ensure that best practice can be shared.

Major Schemes Framework

5.4.24. Following the success of the Major Schemes Framework 1, 2 and 3, the Major Schemes Framework 4(MSF4) recognises that a culture of collaborative relationship management at both an operational and strategic level offers significant benefits for all parties, particularly in a long contractual relationship.

5.4.25. It will, therefore, strive to develop collaborative relationships with its partner contractors. The primary aim of MSF4 will remain the efficient delivery of highway improvement projects, supported by the existing successful approach to:

- Collaboration – high levels of participation in the regular Framework Community Board
- Early Contractor Involvement – contractors being selected typically more than twelve months before the start of construction, sometimes more
- Investment in skills – every project has an Employment and Skills Plan in place and is committed to a Building Social Value assessment
- Performance management – monthly reporting of performance across a range of quality criteria shows high levels of client satisfaction and over 25% of completed projects have secured regional/national awards.

Scape Civil Engineering Framework

5.4.26. Scape provides significant benefits in terms of early contractor involvement as well as having a number of Key Performance Indicators which require the Scape Civil Engineering Framework contractor to provide significant social value through delivering projects in the local community such as:

- Delivering through the local supply chain and SME's.
- Creating opportunities for local employment, including apprentices, graduates and work placements.
- Supporting local communities through STEM engagement with schools, supporting care leavers and creating opportunities for disadvantaged people.
- Improving skills local people and employability skills for young people.
- Providing local volunteer days to support local organisations and charities.
- Diverting waste from landfill and reducing carbon emissions.

5.4.27. To mitigate any potential risk that could arise from a single source contract, as the final cost could be higher than via a competitive process, an independent due diligence is typically conducted on work estimates, to indicate that costs are deemed to be of an appropriate order.

5.4.28. The Crown Commercial Service Framework and East of England Framework can also be utilised by WNC to deliver the scheme.

5.5 PRICING FRAMEWORK AND CHARGING MECHANISMS

5.5.1. The construction payment mechanism will be in accordance with the NEC 4 contract which has the following options:

- Option A: Priced contract with activity schedule prepared by the contractor
- Option B: Priced contract with Bill of Quantities prepared by the client
- Options C and D: Target cost contracts with activity schedule or Bill of Quantities
- Option E: Cost reimbursable contract
- Option F: Management Contract

5.5.2. In the past WNC have tended towards target cost arrangement (Option C above), this contains a mechanism for sharing risk and rewards known colloquially as a "pain/gain" mechanism. This fits well with the philosophy behind the NEC suite of contracts more generally which is designed to

achieve more of a collaborative approach to contracting than the traditional Joint Contracts Tribunal (JCT) style contract using “foresighted collaboration” to reduce the risks in the construction process.

5.6 RISK ALLOCATION AND TRANSFER

5.6.1. Thorough risk assessment processes and mitigation measures have been established and undertaken throughout the development of the scheme to date. Through detailed design, the design and construction teams will further develop the risk register and design risks will be managed and mitigated.

5.6.2. Following the design stage, the primary risks going forward will be in construction. The ownership of these risks is built into the construction contract to ensure that risks are the responsibility of the party best placed to manage them.

5.6.3. WNC’s Project Management Team are responsible for wider risks, including managing planning consent and the discharge of planning conditions; road space and rail agreements; land acquisition; funding arrangements; non-construction programme conflicts; and demands from businesses and residents.

5.7 HUMAN RESOURCES ISSUES

5.7.1. No significant human resources issues have been identified that could affect the deliverability of the scheme. No TUPE issues are expected. The Council will provide personnel to perform the role of Project Manager and create a small site supervision team.

5.7.2. More information on the governance and management of the project, including details of the people involved, is set out in the Management Case.

6 MANAGEMENT CASE/DIMENSION

6.1 INTRODUCTION AND OBJECTIVES

6.1.1. The Management Case presents the proposed delivery plan for the scheme to ensure its successful outcome. This chapter provides assurance that a robust delivery process is in place including details of the proposed programme, resources, impacts, problems, stakeholder and public consultation, to ensure that the scheme is ultimately on time and to budget.

6.2 EVIDENCE OF SIMILAR PROJECTS

6.2.1. WNC (previously as NCC) has delivered a number of successful transport schemes in the region, working alongside their internal and external contractors. Previous schemes include Governance, organisational structure and roles.

- **A43 Northampton to Kettering Improvements (Phases 1b and 2)**: This dualling scheme focuses on the A43 north of Northampton and involves improvements to the Round Spinney roundabout, dualling sections of the existing alignment and providing a new section of road, bypassing the old alignment. These phases are now open to traffic and used the MHA procurement route. The scheme is directly linked to enabling growth to the north of Northampton, including specifically the Overstone Leys and Roundhill Park developments (North Northampton Sustainable Urban Extension).
- **A45 Daventry Development Link Road**: A new 3.5km single carriageway, starting at a new roundabout on the existing A45 between the villages of Dodford and Weedon. It then passes to the north of the villages of Weedon, Flore and Upper Heyford before re-joining the A45 at a new roundabout between Upper Heyford and the M1 Motorway at Junction 16. The scheme was successfully delivered using funding from the SEMLEP Local Growth Deal, the Highways England Growth and Housing Fund, Northamptonshire County Council, Daventry District Council and developer funding. The Link Road opened to traffic in 2018.
- **Northampton North West Relief Road:** The West Northamptonshire Council project is currently under construction. The scheme is to deliver a road in two phases – one publicly funded, and the other developer led. When complete the North West Relief Road will provide a strategic link and unlock the delivery of new residential development.
- **Cycle CoNNect**: A 24 hour on-street bike hire service in Northampton, with bikes available to hire across the network at any time, every day. NCC has developed a network of 9 Cycle CoNNect docking stations across Northampton where you can hire and return a bicycle and there will be 50 bikes available to hire across the network at any time of the day, every day. This is a successful scheme development by NCC which can be used by residents, commuters, students and visitors.

6.3 ASSURANCE

ASSURANCE STRATEGY

6.3.1. This business case has been developed in line with the Department for Transport Analysis Guidance (TAG) and will follow the necessary approvals.

6.3.2. The scheme will be managed day-to-day by the CPDU, which, since its creation in 2009, has successfully provided enhanced governance and management of the major highways programme,

both for Northamptonshire County Council prior to the split and WNC. The CPDU has managed the delivery of highway projects valued in excess of £160 million to programme and budget.

6.3.3. The CPDU draws upon the resources and skills available within NNC/WNC highway services provider and external organisations with Project Directors and Project Managers appointed based on appropriate skills and experience. Staff within the CPDU work to Terms of Reference agreed with WNC and in accordance with externally accredited ISO 9001:2015 project management processes based on Prince 2 project management methodology, with projects managed by end stage and exception.

6.3.4. The scheme will follow applicable assurance and approval processes at both a national and local level. As the scheme has a value of over £20 million, the business case has been developed in line with the required TAG processes. The business case will need to be signed off to the satisfaction of the WNC Section 151 Officer in their role as the Chief Financial Officer.

ASSURANCE - GATEWAY REVIEWS

6.3.5. It is essential that large, complex and long-running projects are monitored effectively. All major transport schemes must demonstrate that a system for monitoring progress is part of the management structure and plan. The Gateway Review process is a formal assessment of the progress of a project at key stages in its development.

6.3.6. Gateway Reviews will be undertaken in line with the principles set out in the Project Control Handbook. A Gateway review is a 'peer review' in which independent project managers from outside the project use their experience and expertise to examine the progress and likelihood of successful delivery of the project.

6.3.7. A Gateway Review provides assurance and support to the Senior Responsible Officer (SRO) 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
- Lessons are learned
- The project team are gaining input from appropriate stakeholders.

6.3.8. Gateway Reviews are a mandated assurance process for all publicly funded major projects, although not all reviews will apply to all projects. The SRO and A422 Farthinghoe Bypass Project Manager will engage early with the relevant parties to agree which gateways are required and when. Throughout the process, guidance and advice will be sought from relevant centres of expertise (e.g. finance, procurement, economists).

6.3.9. The Gateway Reviews will assess the project's viability, the value for money to be achieved, and the proposed approach for achieving delivery of the project's objectives. This approach will allow the review to assure the Project Board that the selected delivery approach is appropriate.

6.3.10. The following are the normal stages for Gateway Reviews, as part of the process of managing stage boundaries:

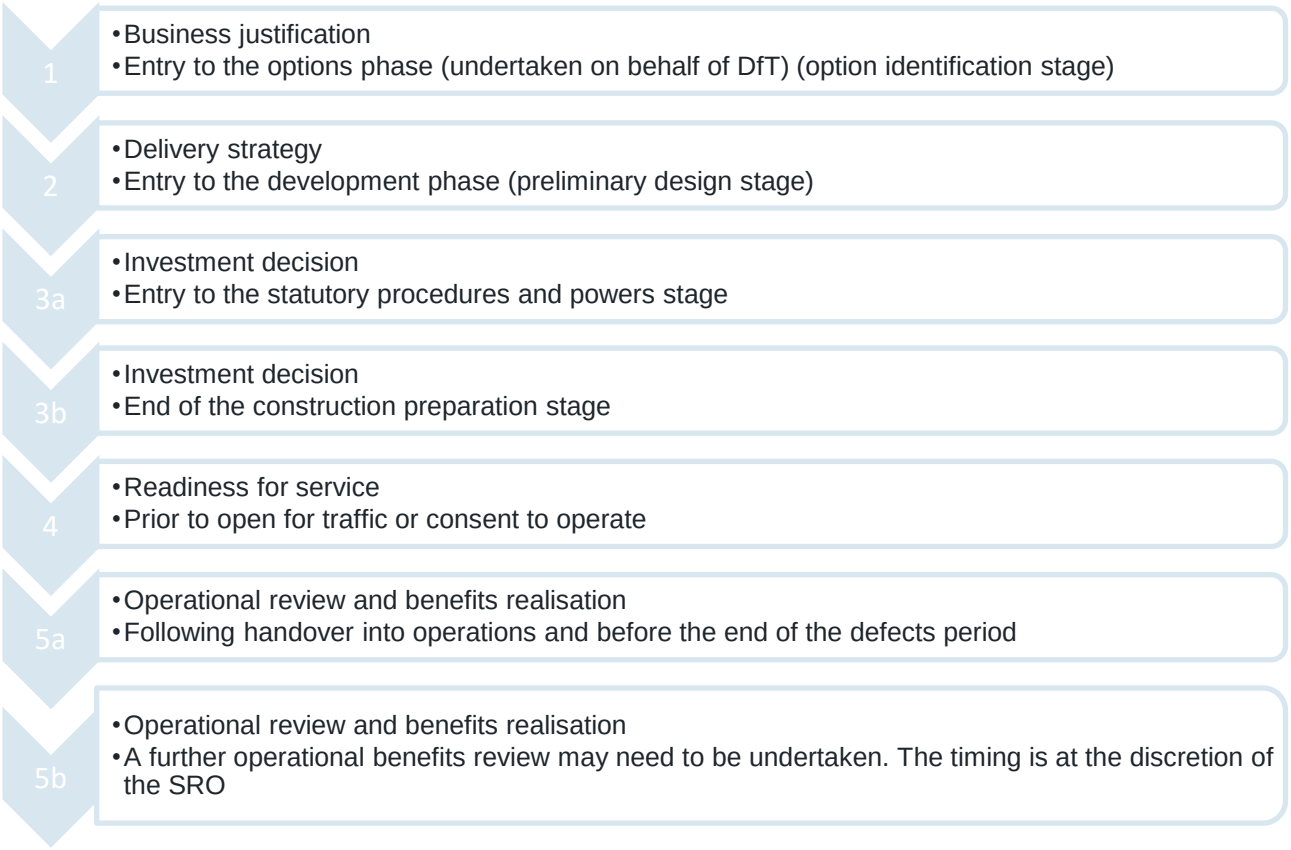


Figure 6-1 - Gateway Review Stages

6.3.11. The Project Manager will have overall responsibility for delivering the tasks required to achieve key milestones. The A422 Farthinghoe Bypass is at the Stage 1 Business justification stage.

6.4 CARBON MANAGEMENT

6.4.1. The purpose of the carbon management process is to manage and reduce Greenhouse Gas (GHG) emissions (shorthand: carbon) over the course of the project lifecycle. These actions must be informed by carbon assessments that provide an understanding of whole-life carbon impact.

6.4.2. Whole-life carbon impacts account for all life cycle stages of a piece of infrastructure, including:

- Raw material extraction
- Product manufacture
- Transport
- Installation on site
- Infrastructure operation
- Maintenance
- Disposal

6.4.3. This section details the methods that will be used to undertake the GHG assessment. The methods have followed best practice carbon accounting guidance including the GHG Protocol[2], PAS2080:2023 Carbon Management in Infrastructure and BS EN 15978:2011: Sustainability of Construction Works. The process for identifying likely significant effects follows the principles of PAS 2080:2023 Carbon Management in Infrastructure, which provides a breakdown of stages A1 to C4 of whole life carbon assessments.

6.4.4. The sources of carbon emissions for the Proposed Scheme were identified following discussions with the Project Team and using professional judgement. Based on the expected magnitude of carbon emissions from each emissions source, they were identified for inclusion in the carbon assessment, or considered to be immaterial and have therefore not been considered further in the assessment.

Table 6-1 – Elements Scoped Out of the Assessment

Lifecycle Stage	Justification
Disposal of waste (A5)	Construction waste is expected to be largely inert, and as such is not expected to result in GHG emissions on disposal.
Operation	
Operational energy consumption (B1)	Emissions from lighting, have been excluded as they are not expected to be a large magnitude.
Decommissioning process (C1-4)	Expected timescales for decommissioning are so far into the future that there is insufficient certainty about the likelihood, type or scale of emissions activity to determine their likely magnitude, even if they take place at all. As such these emissions sources will not be considered.

[2] World Resources Institute & World Business Council for Sustainable Development (2015). GHG Protocol Corporate Accounting and Reporting Standard.

6.4.5. The elements shown in Table 6-2 depict the GHG emission sources that have been scoped in for this assessment.

Table 6-2 – Elements Scoped into the Assessment

Lifecycle Stage	Potential Sources of Emissions
Construction	
Product stage; including raw material supply, transport and manufacture (A1-3)	Embodied emissions associated with extraction and manufacturing of the required raw materials.
Construction process stage; including transport to/from works site and construction/installation processes (A4-5)	Activities of organisations conducting construction work, including fuel/energy consumption by delivery of materials, transportation of waste and construction plant emissions.
Operation	
End user traffic emissions (D)	Change in end-user emissions from the surrounding network (increase or decrease).
Replacement (B4)	Emissions from replacement of materials throughout the lifespan of the Proposed Scheme

Table 6-3 - National Carbon Budgets set by the Government (million tonnes (Mt) CO2e)

Carbon Budget Period	UK Carbon Budget
Third: 2018-2022	2,544 MtCO2e
Fourth: 2023-2027	1,950 MtCO2e
Fifth: 2028-2032	1,725 MtCO2e

6.4.6. The National Policy Statement for National Networks (NPSNN) sets out that "it is very unlikely that the impact of a road project will, in isolation, affect the ability of Government to meet its carbon reduction plan targets." To provide additional context, the transport emissions from 2018 within South Northamptonshire, Northamptonshire and nationally[3] are presented in Table 6-4 expressed in thousands of tonnes of carbon dioxide equivalents (ktCO2e).

[3] Department for Business, Energy and Industrial Strategy (2019) UK local and regional CO_2 emissions, https://www.gov.uk/government/statistics/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics-2005-to-2018 [Accessed 14/09/20].

Table 6-4 – Transport GHG Emissions in 2018 for South Northamptonshire, Northamptonshire, and Nationally (thousand tonnes (kt) CO2)

Category	South Northamptonshire (ktCO2)	Northamptonshire (ktCO2)	National (ktCO2)
I. Road Transport (A roads)	216.2	1,199.2	54,229.2
J. Road Transport (Motorways)	291.2	545.1	29,936.4
K. Road Transport (Minor roads)	74.3	465.0	38,485.8
L. Diesel Railways	16.3	28.9	1,900.4
M. Transport Other	3.8	29.5	2,249.2
Road Total	**581.7**	**2,209.3**	**122,651.4**
Transport Total	**601.9**	**2,267.8**	**126,801.1**

6.4.7. The proposed A422 Farthinghoe bypass would be classed as an A road and therefore contribute to the second highest ranking Category I for South Northamptonshire, but highest for Northamptonshire and Nationally.

6.5 PROJECT SCOPE, DEPENDENCIES AND CONSTRAINTS

6.5.1. The A422 Farthinghoe Bypass is a stand-alone scheme in principle, which could be delivered independently of any other scheme or development. Similarly, no other future schemes or developments are dependent upon it. While there are no defined dependent developments requiring the A422 Farthinghoe Bypass to be delivered, it is one of the major highways projects in West Northamptonshire.

6.5.2. The bypass can relief the traffic through the village which is expected to be made worse by the level of development proposed in Banbury and Brackley.

6.5.3. One of the major objectives for the bypass is to reduce the number of HGVs passing the two sharp bends on the A422 within the Farthinghoe Village.

PROJECT CONSTRAINT

Ecological constraints

6.5.4. As most records were located within the Farthinghoe LNR and comprised of birds and insects, a Natural England Protected Species Mitigation Licence may be required for works on the Northern Route Options.

Engineering constraints

6.5.5. There are potential impacts for each of the five proposed options. In general, the landscape impacts include the increase in built form, loss of mature tree and hedgerow cover and loss of agricultural land including field boundaries and field pattern.

6.5.6. The other constraints from all the five options include the crossing of two existing roads, three Footpaths and two Bridleways. It would also pass through a disused Sewage Works and multiple land parcels. It would also result in the loss of sections of established hedgerows and hedgerow trees.

6.6 PROJECT PLAN

6.6.1. As the scheme develops a project plan will be developed which covers each key stage of the project and the critical path. The Project Manager will have overall responsibility for delivering the tasks required to achieve key milestones. The likely key project milestones are set out in Table 6-5.

Table 6-5 – Key Milestones

Key Milestones	Projected Date
Submission of Enhanced Strategic Outline Business Case to Funding Authority	TBC
Submission of planning application	September 2025
Publication of scheme orders/CPOs	February 2026
Confirmation of all statutory orders and consents	February 2027
Full Business Case submitted to Funding Authority	June 2027
Scheme open to public	Oct 2029

6.7 STAKEHOLDER ENGAGEMENT AND COMMUNICATIONS

COMMUNICATION AND ENGAGEMENT STRATEGY

6.7.1. The Council has a robust stakeholder engagement and communications process which is used on all significant projects through a dedicated in-house team. The Council and design consultants continue to work with landowners, key stakeholders and members of the public to ensure that a

clear and transparent process is being undertaken based upon the specific needs of each group in line with guidance and statutory processes.

6.7.2. The Strategic Case highlights the consultation and stakeholder engagement which has taken place to date. This clear, open engagement and dialogue will continue into the next stages of the project, with further update and a Communications Plan to be provided as part of the OBC.

6.8 RISK AND ISSUES MANAGEMENT

6.8.1. Project risks will be managed and reported to ensure that they are kept up to date throughout the life cycle of the project, which is set out in the Management Dimension. A live detailed scheme risk register has been produced to identify the current scope of risks associated with the scheme and appropriate mitigation measures.

6.8.2. The risk register identifies the risks associated with the project. Risks and opportunities run through all stages and areas of the project. They are categorised into types, these being: Preparation, Land or Construction. Risks are also assigned an owner organisation and a person to take responsibility. It is important that risk and opportunity are considered seriously at the outset and throughout the life of a project to protect, and maximise, opportunity.

6.8.3. The full risk register has been reviewed with mitigation measures identified for each risk to reduce the impact that this will have on the outputs and outcomes of the scheme. Further details of some of the key risks identified and mitigation measures are provided in the Management Dimension. Some of the key risks identified in the A422 Farthinghoe Bypass Next Steps Proposal (February 2021) include, but are not limited to:

- Evidence from the previous stage of the project suggests that detailed LIDAR survey data for the area is incomplete. There will be impacts on the design effectiveness and potential delays if alternative data is not provided.
- Access is required for various plots of land under different ownership for survey work. The delay in obtaining access may impact on critical survey dates (e.g. seasonal environmental surveys).

6.8.4. There are several risks identified where no mitigation measures were provided. These include, but are not limited to:

- Environmental surveys reveal constraints that cause delays or render the scheme non-viable e.g. protected species or other issue.
- Geotechnical investigation results reveal constraints that render the scheme non-viable. Some significant geotechnical risks have been identified.
- The scheme was considered economically non-viable.

6.9 BENEFITS MANAGEMENTS AND EVALUATION

6.9.1. The purpose of benefits realisation plan is to track the expected benefits to be accrued over the lifetime of the scheme as shown in Table 6-6. The plan details the activities required to track the progress of the scheme including project milestones and responsibilities. Monitoring will take place prior to scheme opening (baseline) and at predefined intervals upon successful delivery of the scheme.

Table 6-6 – Benefits Realisation Plan

Benefit	Beneficiary	Outcomes	User benefit	Baseline measure	Timescale
Improved resilience	Local and strategic trips	Improved reliability of journey times	Confidence in journey length and quality	Journey time variance	1 & 5 years post opening
Higher standard of road	Through traffic	Improved journey times Improved safety Comply to the Design Manual for Road and Bridge Works	Less time spent travelling (value of time) Reduced potential for road traffic incidents	Journey time surveys Number and severity of road traffic incidents	1 & 5 years post opening

Appendix A

PLACE BASED ANALYSIS

West Northamptonshire Council

A422 FARTHINGHOE BYPASS

Place-Based Analysis

AUGUST 2023

West Northamptonshire Council

A422 FARTHINGHOE BYPASS

Place-Based Analysis

TYPE OF DOCUMENT (VERSION) CONFIDENTIAL

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West Northamptonshire Council

A422 FARTHINGHOE BYPASS

Place-Based Analysis

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QUALITY CONTROL

Issue/revision	First issue	Revision 1	Revision 2	Revision 3
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Signature				
Project number	70104161			
Report number	1.0			
File reference	Place Based Analysis			

CONTENTS

FIGURES

1 INTRODUCTION

1.1 INTRODUCTION

This A422 Farthinghoe Bypass Place-Based Analysis Report provides detailed place-based analysis for the area surrounding the proposed A422 Farthinghoe Bypass. Analysis in the following three broad areas has been undertaken to provide an understanding of the character of the area and why intervention may be needed:

- Demographic
- Economy and education
- Connectivity

1.2 STUDY AREA AND DATA

For the study area, the 2021 census Lower Super Output Areas (LSOAs) for West Northamptonshire and the Cherwell District of Oxfordshire have been utilised. Whilst Farthinghoe is located within West Northamptonshire, the A422 connects Banbury and Brackley, with the village having significant connections with the neighbouring towns. As such, we have included information for West Northamptonshire and the neighbouring Cherwell District.

For most categories, 2021 census data has been used for analysis. This data is beneficial due to its availability on a small scale, so issues can be highlighted to specific locations within the area. Where information is drawn from other sources, they are labelled accordingly.

Figure 1-1 presents the study area.

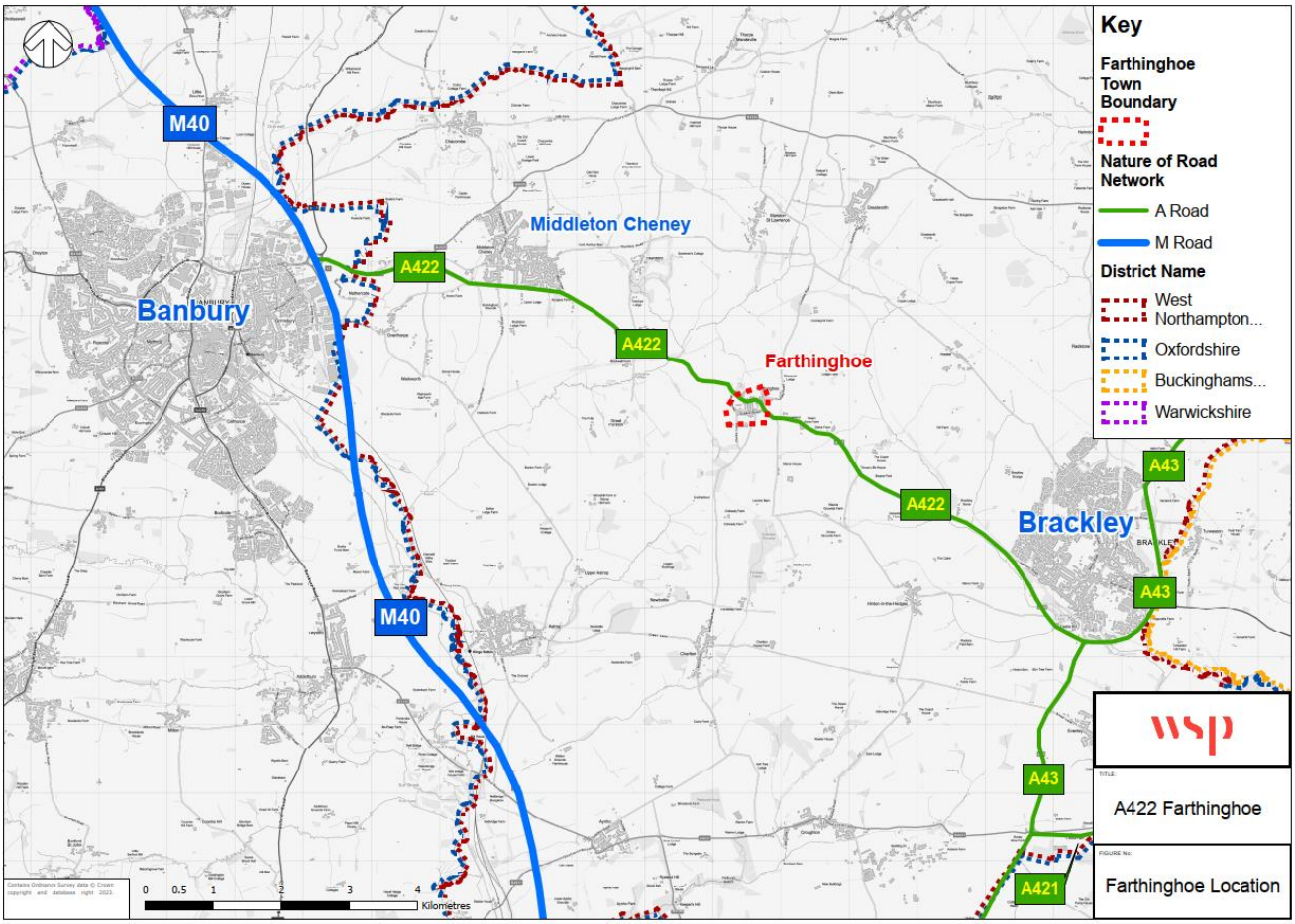


Figure 1-1 - Study Area

2 DEMOGRAPHIC ANALYSIS

2.1 POPULATION

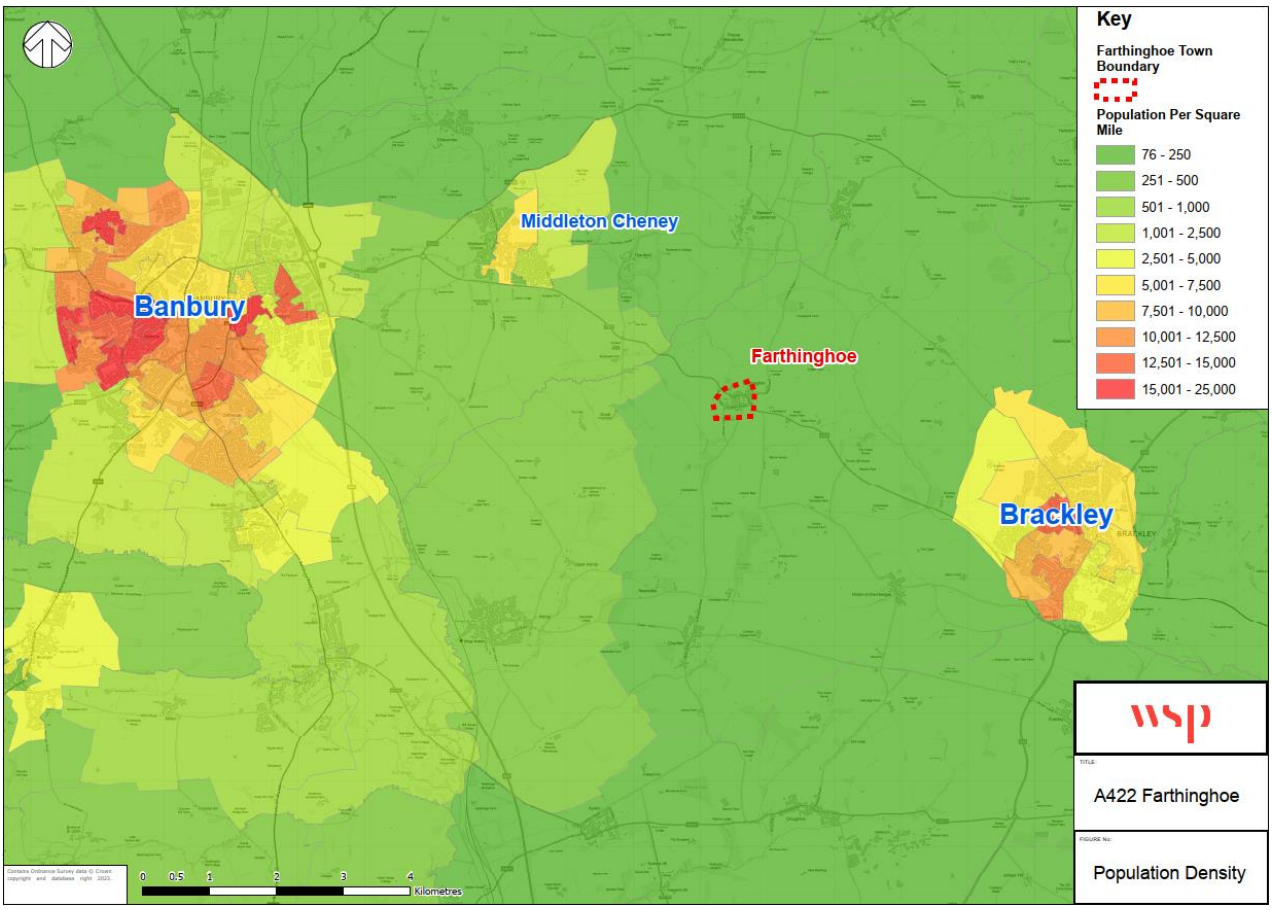
At the time of the 2011 census, the village of Farthinghoe had a population of 413. This had increased to 418 at the time of the 2021, a shift of circa 1%.

In regard to the other key towns within the study area:

- Banbury's population increased from 46,853 at the time of the 2011 Census, to 54,335 at the time of the 2021 Census. This is an increase of 16%.
- Brackley's population increased from 13,018 at the time of the 2011 Census, to 16,195 at the time of the 2021. This is a change of 24%.

2.1.1 POPULATION DENSITY

Figure 2-1 shows the population density at the 2021 census.



Source: ONS Census 2021

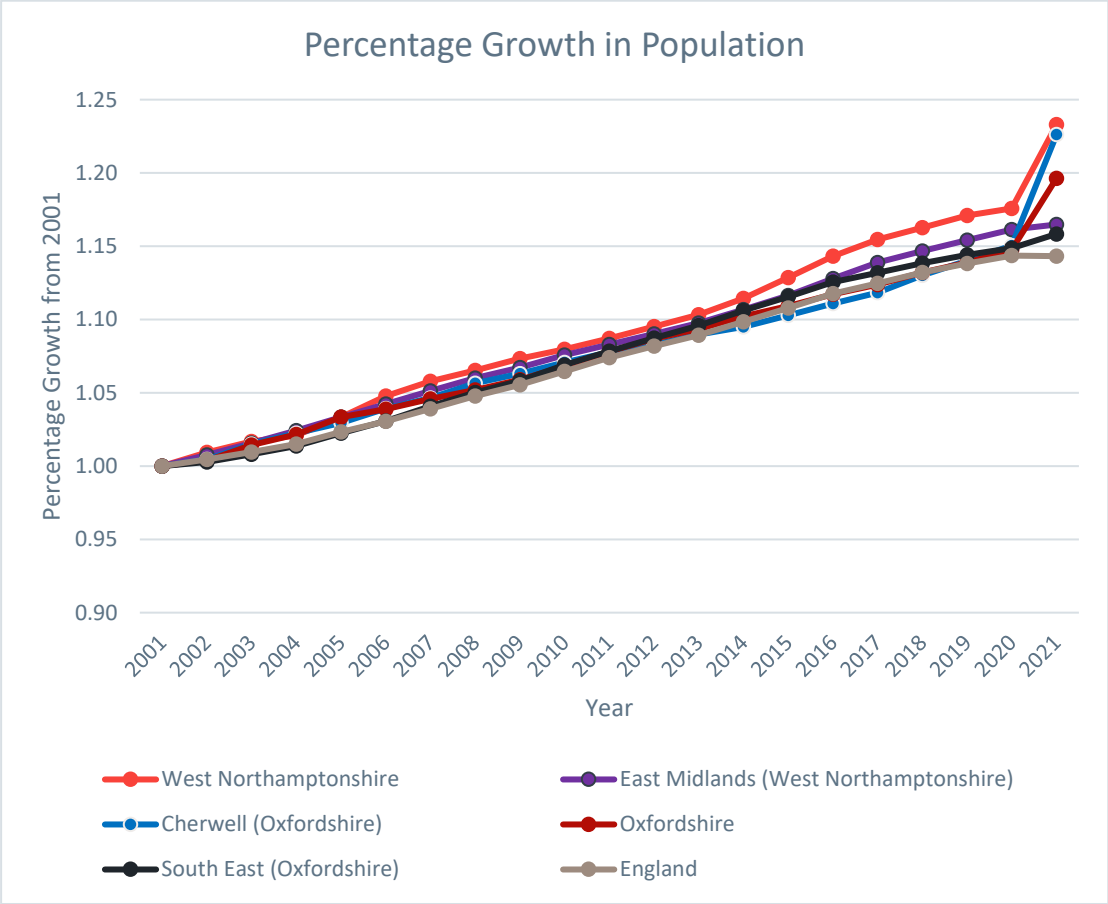
Figure 2-1 - Population Density

Banbury and Brackley are the most densely populated towns within the study area, followed by the centre of Middleton Cheney. The remainder of the area is quite rural in nature, with 123 people per square mile in the LSOA containing Farthinghoe, increasing to 501-1,000 people per square mile in

the villages to its west. This is in line with the average population density of the UK (714 people/square mile) and the East Midlands Region (Including Northamptonshire, 808 people/square mile).

Figure 2-2 displays the percentage growth in the population in England, the East Midlands, West Northamptonshire, Oxfordshire and the South East.

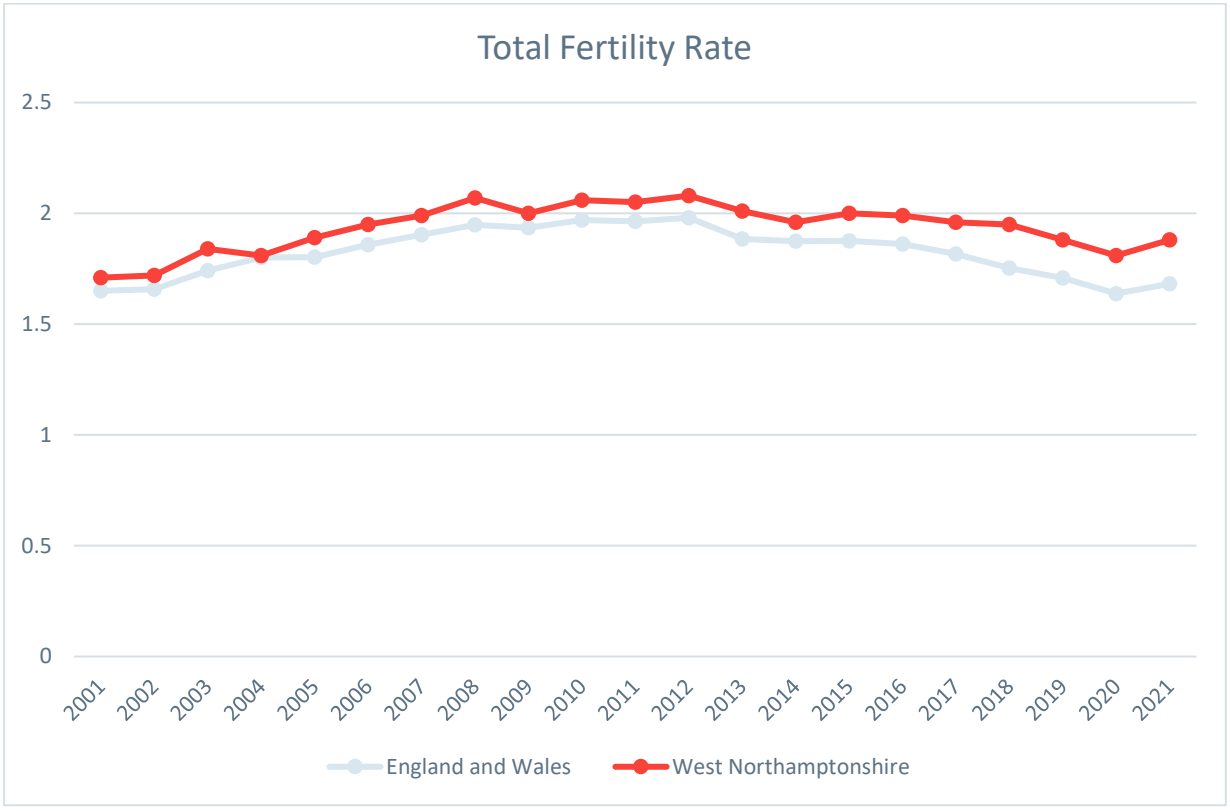
This is based on ONS mid-year population projections. As shown, there was significantly more growth in population in West Northamptonshire compared to the wider East Midlands region or the UK as a whole. The neighbouring county of Oxfordshire also shows marked growth, particularly between 2020 and 2021.



Source: ONS Mid-year Population Projections

Figure 2-2 - Population Growth

Figure 2-3 shows the total fertility rate (TFR) in England and Wales, and West Northamptonshire. The total fertility rate in a specific year is defined as the total number of children that would be born to each woman if she were to live to the end of her child-bearing years and give birth to children in alignment with the prevailing age-specific fertility rates. This data reiterates the population growth data, whereby the fertility rate in West Northamptonshire is higher than both England and Wales.



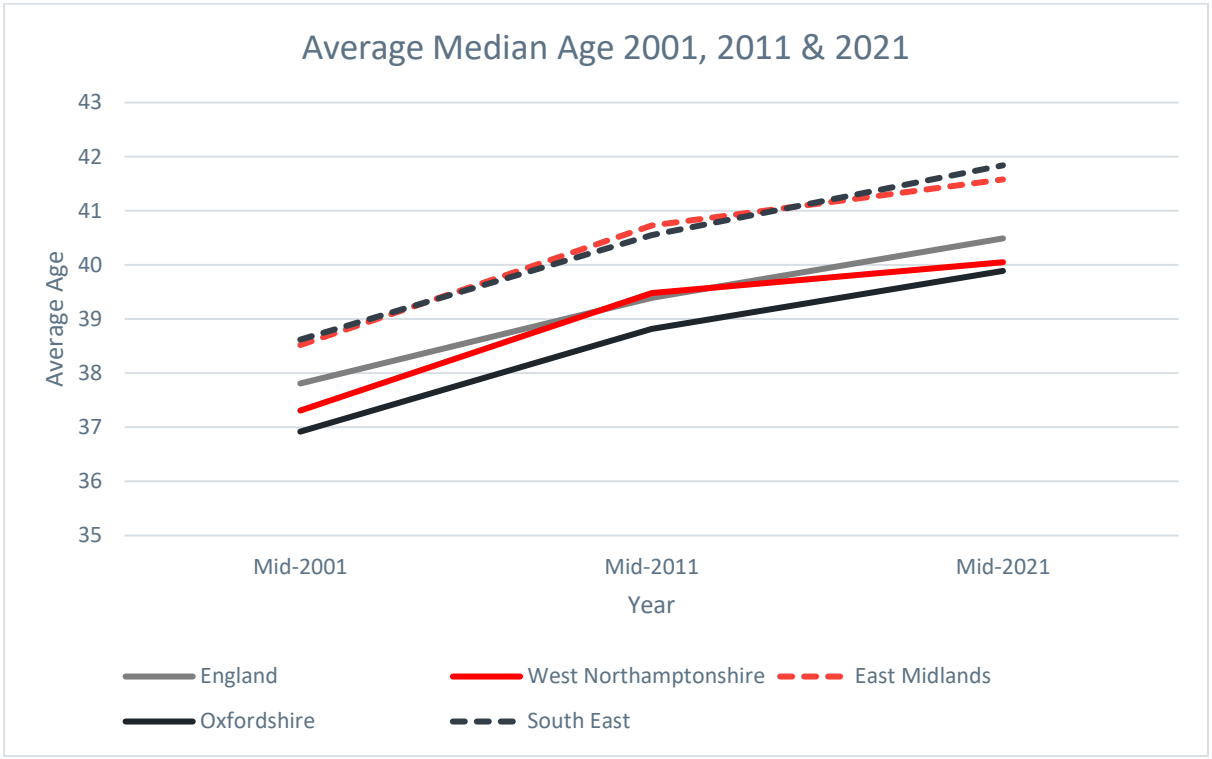
Source: ONS

Figure 2-3 - Fertility Rate

2.2 AGE

Figure 2-4 shows the average (median) age in the counties and regions comprising the study area in 2001, 2011 and 2021. As shown, the average age has increased across both the counties and the regions.

The average age in West Northamptonshire and Oxfordshire are both close to 40. This is lower than the national average (40.5) and the regional averages of 41.6 for the East Midlands and 41.8 for Oxfordshire.

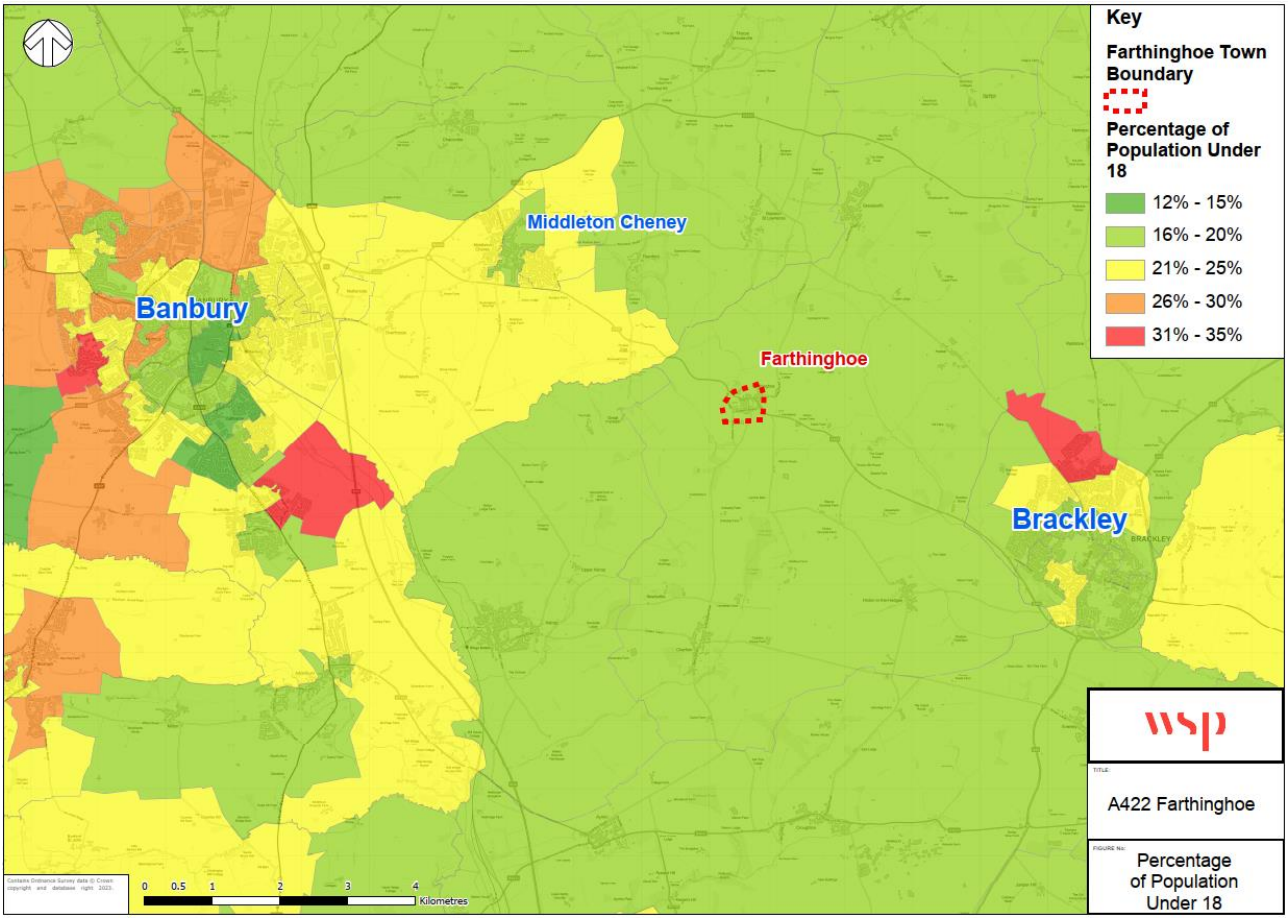


Source: ONS Mid-year Population Projections

Figure 2-4 - Average Age

Figure 2-5 and Figure 2-6 show the percentage of under 18s and over 65s in Banbury and Brackley.

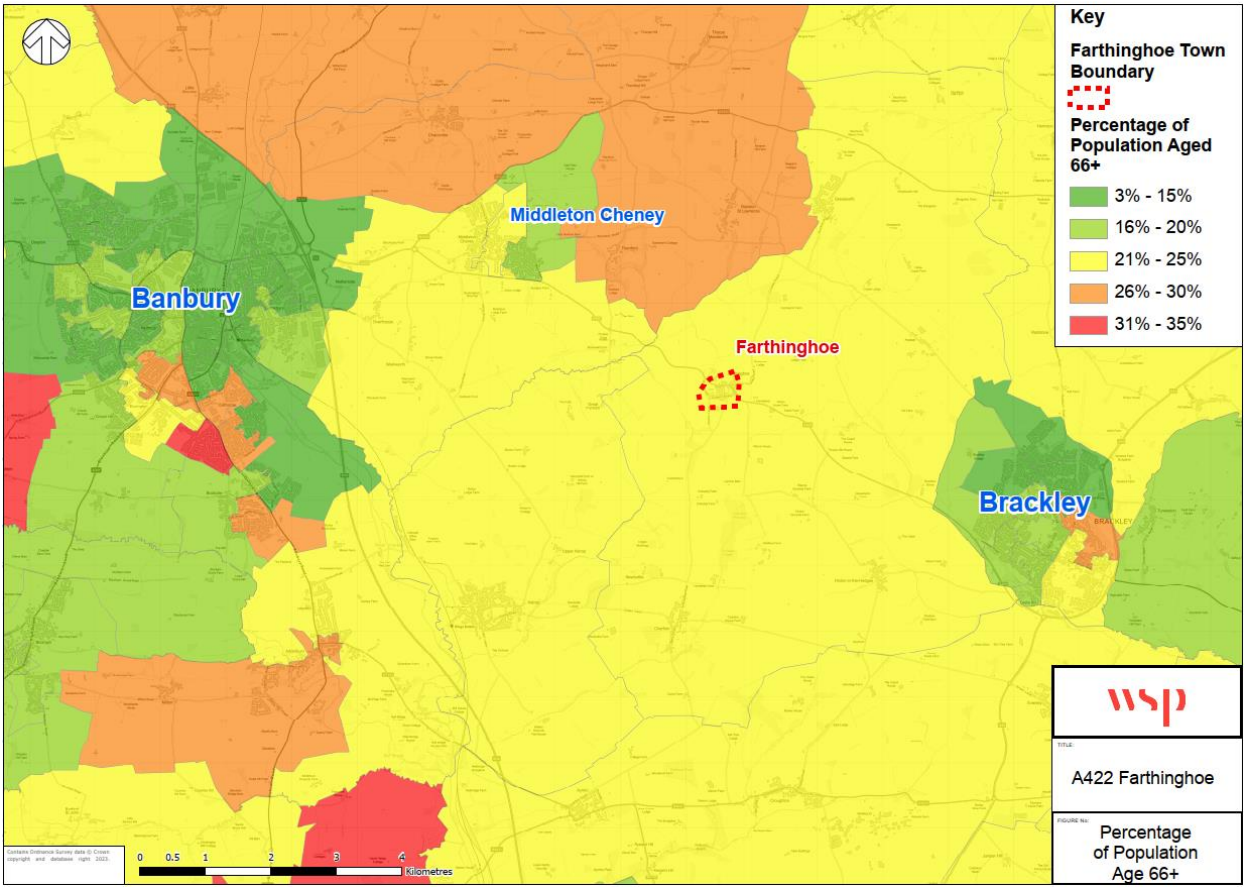
As shown in Figure 2-5, 16-20% of the population in the rural parts of the study area (including Farthinghoe) were under 18 at the time of the 2021 census. This was lower than the national average of 21%. Brackley and west of Banbury both had larger portions of the population who were under 18, forming up to 35% of residents.



Source: ONS Census 2021

Figure 2-5 - Population of under 18s

Figure 2-6 shows that 21%-25% of the residents in Farthinghoe and the surrounding rural area were over 65 at the time of the 2021 census. At a national level, 18% of the population were over 65, meaning that Farthinghoe has an above average population of older people. Banbury and Brackley both have younger populations, with only 3%-20% of residents over 65.



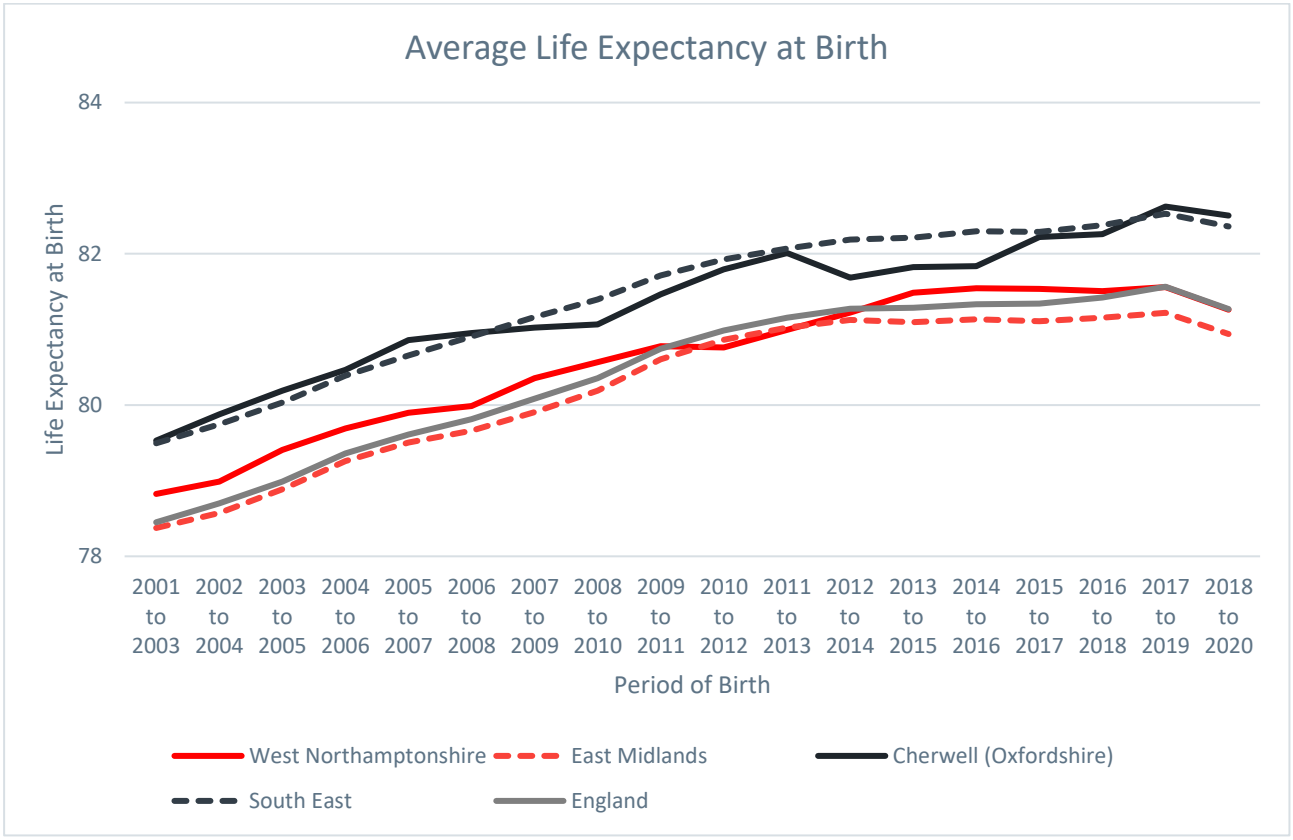
Source: ONS Census 2021

Figure 2-6 - Population of over 65s

2.3 LIFE EXPECTANCY

Figure 2-7 outlines the life expectancy from birth for all those born between 2002-2017. The life expectancy in West Northamptonshire and the wider East Midlands region are broadly consistent with England, with West Northamptonshire generally performing slightly better.

Cherwell (Oxfordshire) and the South East, which form the western boundary of the study area, generally show a life expectancy at birth considerably higher than England or the East Midlands.



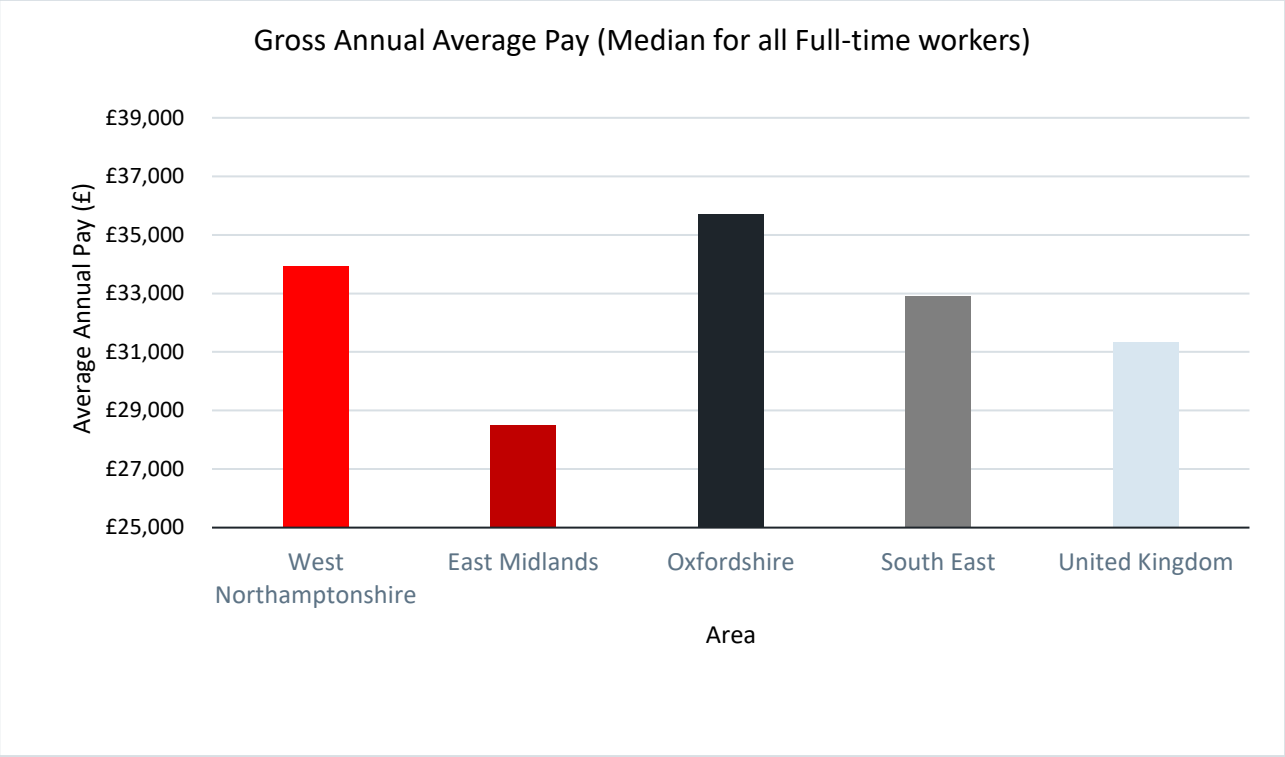
Source: ONS Life Expectancy Projections

Figure 2-7 - Life Expectancy from Birth (Average Male/Female)

3 ECONOMIC AND EDUCATIONAL ANALYSIS

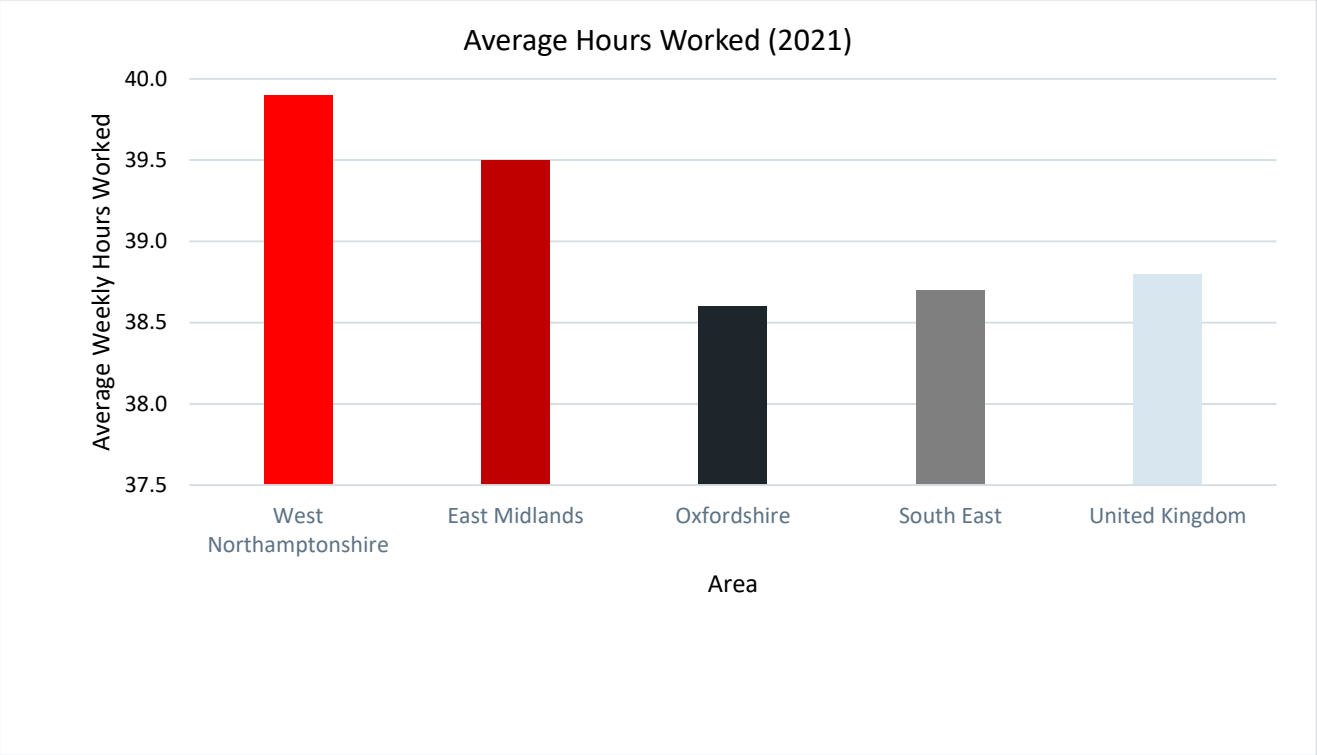
3.1 PAY AND HOURS

Figure 3-1 and Figure 3-2 show average earnings and average hours worked respectively, across the study area of West Northamptonshire and Oxfordshire, in the context of the wider East Midlands and South East Regions, as well as the UK.



Source: Annual Survey of Hours and Earnings (2021)

Figure 3-1 - Average Earnings



Source: Annual Survey of Hours and Earnings (2021)

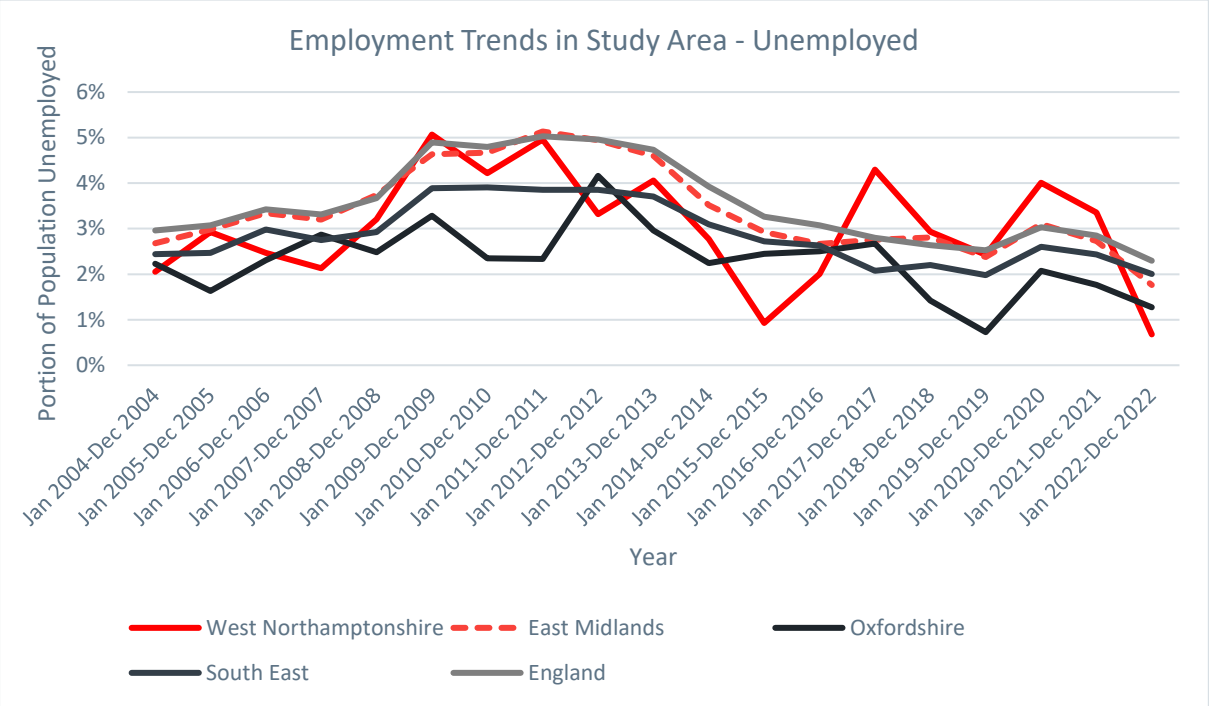
Figure 3-2 - Average hours worked

Figure 3-1 demonstrates that in the West Northamptonshire region average annual pay levels are higher than the wider East Midlands region it sits within, as well as being higher than the national average. Oxfordshire (including Banbury) is higher on average than any of the other regions considered.

Average hours worked for full-time workers in the East Midlands and the West Northamptonshire region in particular are significantly greater than in Oxfordshire, the South East or the UK as a whole. In conjunction with pay in West Northamptonshire area being lower than Oxfordshire, this means that full time workers are working longer hours for less pay. As such, improving connectivity between the East Midlands and Oxfordshire will enable access to higher paid employment for residents.

3.2 ECONOMIC ACTIVITY

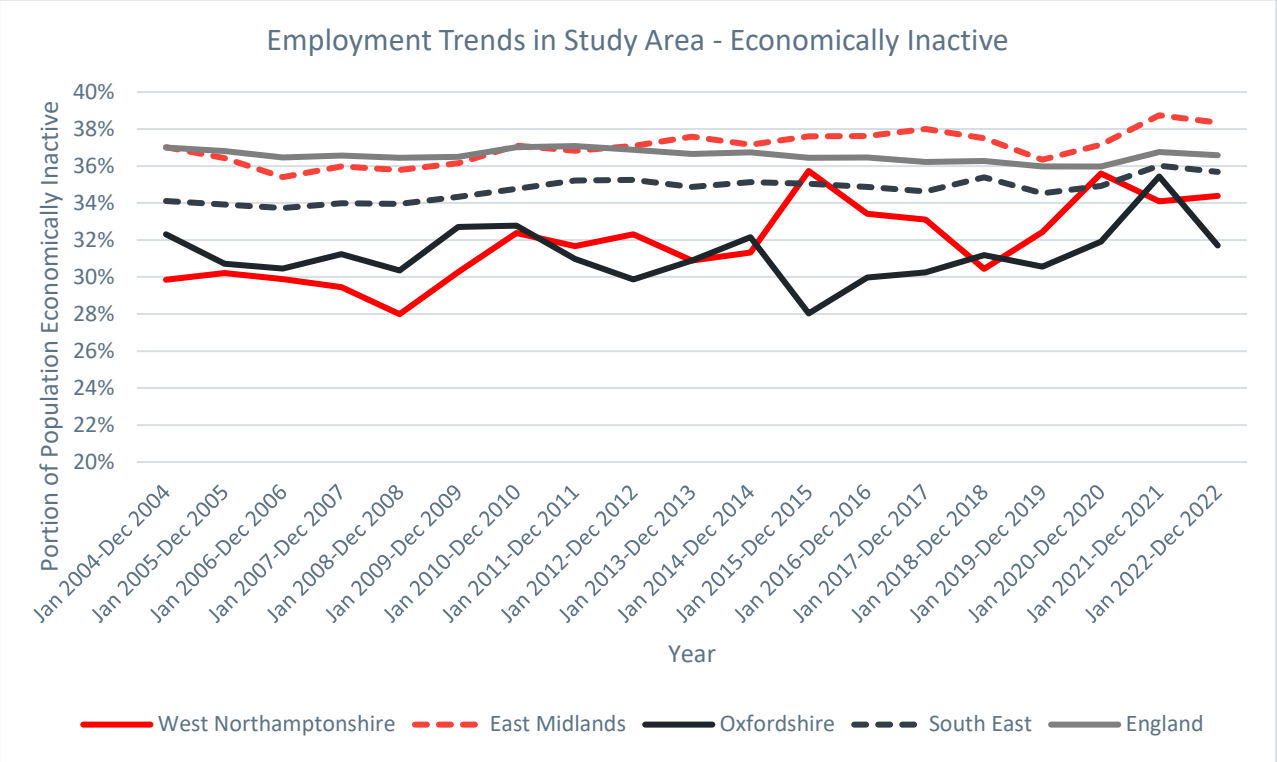
Figure 3-3 shows that the portion of the population of each of the regions in the study area who are unemployed has remained relatively stable between 2004 and 2022. West Northamptonshire shows the most fluctuation over the time period, alternating between having the highest rate of unemployment in 2009 to having the lowest in 2022.



Source: Annual Population Survey

Figure 3-3 - Employment Trends – Portion of Population Unemployed

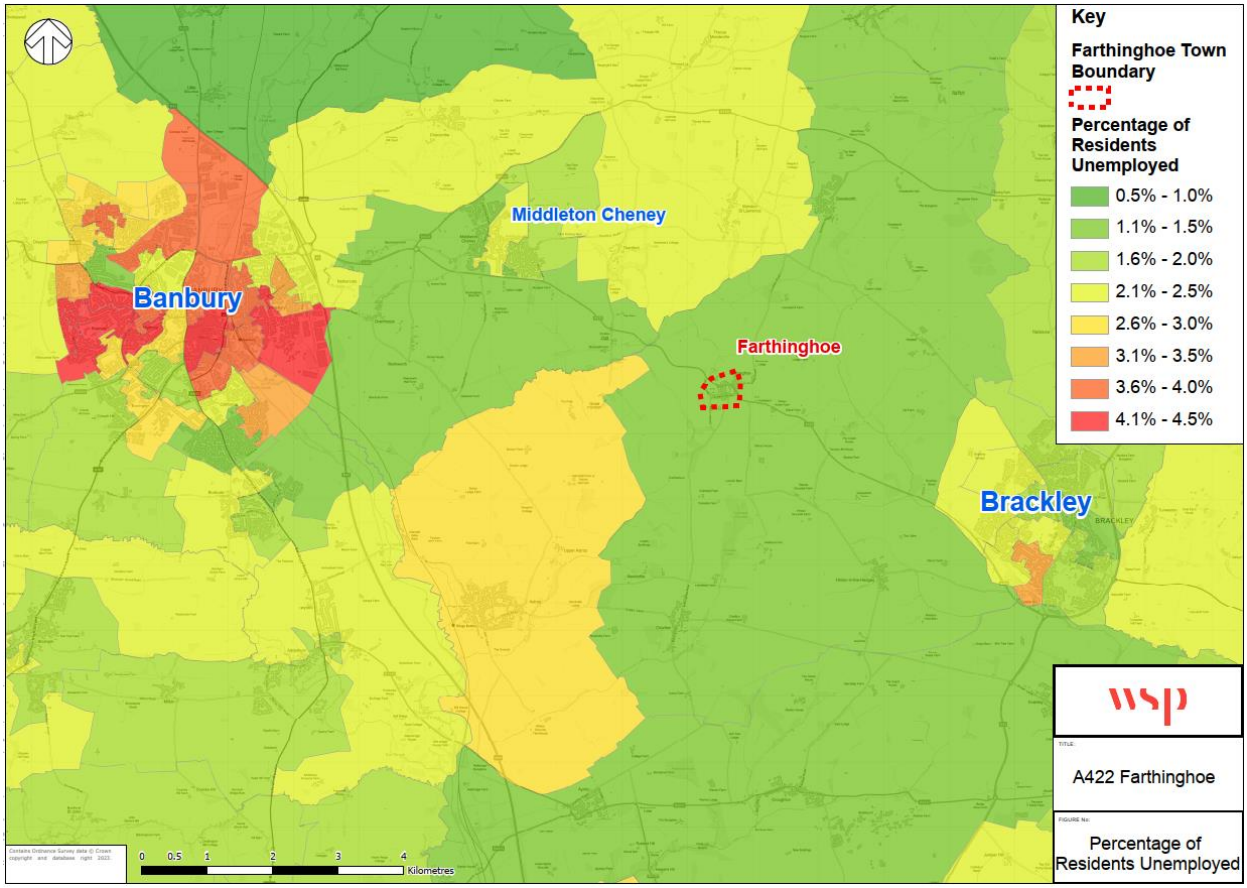
Figure 3-4 shows that the portion of the population who are economically inactive has remained stable since 2004. Both West Northamptonshire County and Oxfordshire County Council consistently show a lower level of economic inactivity than their parent regions or England.



Source: Annual Population Survey

Figure 3-4 - Employment Trends – Portion of Population Economically Inactive

Figure 3-5 shows unemployment within the study area is generally below the 4.53% national average recorded in 2021. Farthinghoe and the area to its northwest are notably lower at 1.46%. The highest unemployment rates in the study area are in Banbury (4.1-4.5%) and Brackley (3.6%-4%); which are still lower than the national average.



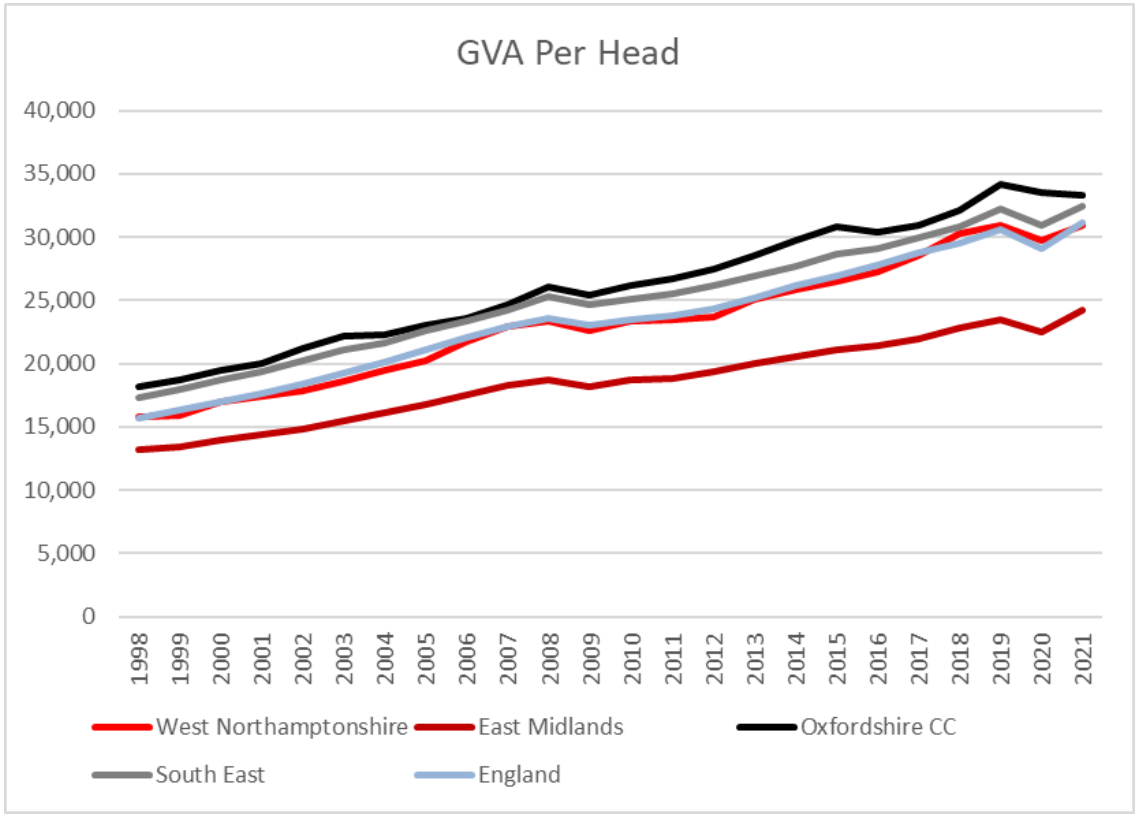
Source: ONS Census 2021

Figure 3-5 - Unemployment Rate

3.3 GVA

The key metric for productivity is Gross Value Added (GVA).

Figure 3-6 shows that West Northamptonshire's GVA Per Head is almost directly in line with the National Average. Oxfordshire and the wider South East region has a markedly higher GVA. Notably, West Northamptonshire outperforms the wider East Midlands region within which it is located; the gap between the East Midlands and both West Northamptonshire and England's average having widened over time.

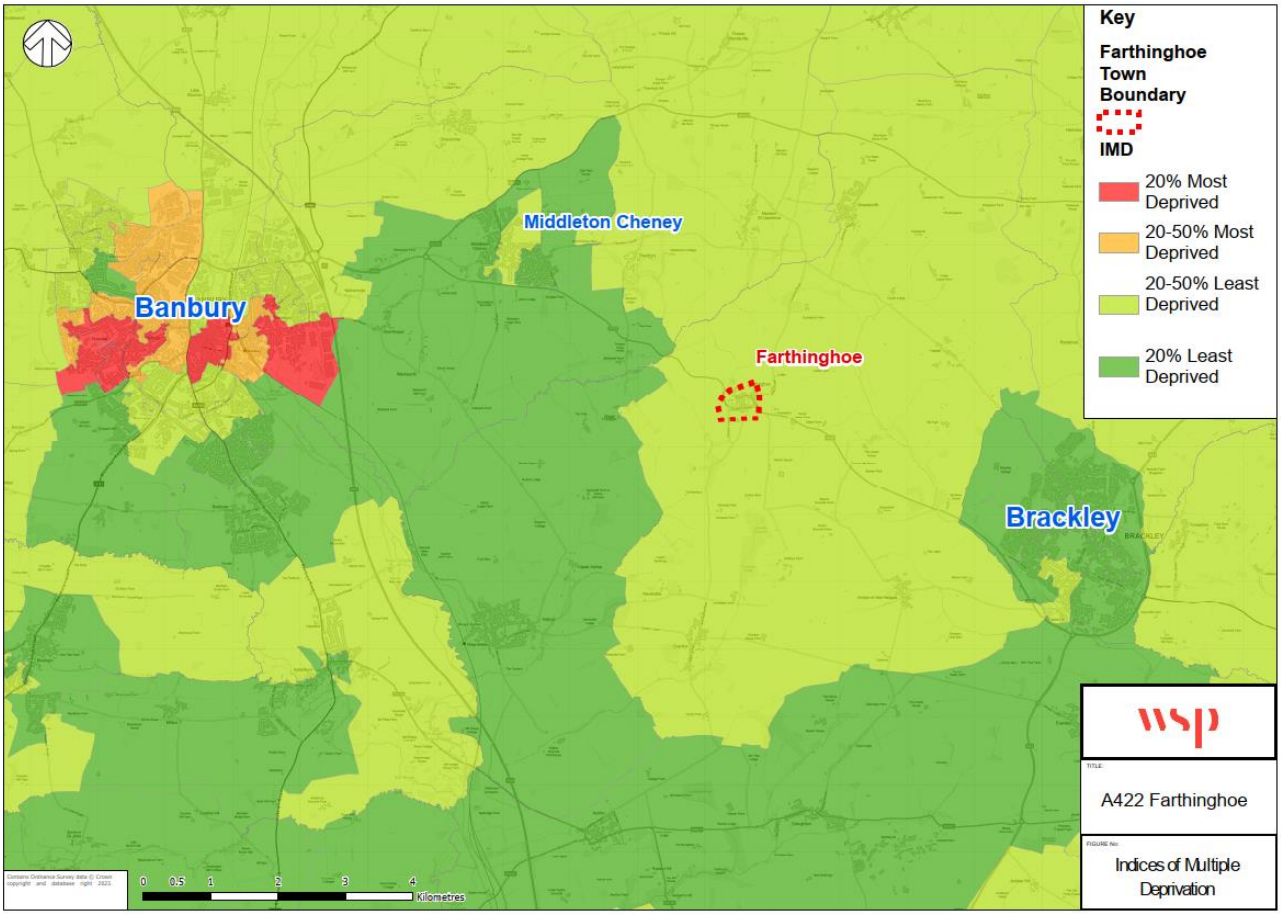


Source: ONS (2022)

Figure 3-6 - GVA per head at current basic prices 1998 to 2020 (ONS)

3.4 DEPRIVATION

Figure 3-7 outlines the Indices of Multiple Deprivation (IMD) in Farthinghoe and the wider study area. Farthinghoe is amongst the 50% least deprived areas of the UK. Brackley, King's Sutton and the rural locations south of the study area are amongst the 20% least deprived. Areas in the 50% most deprived are only found in Banbury, which also has several locations in the 20% most deprived.



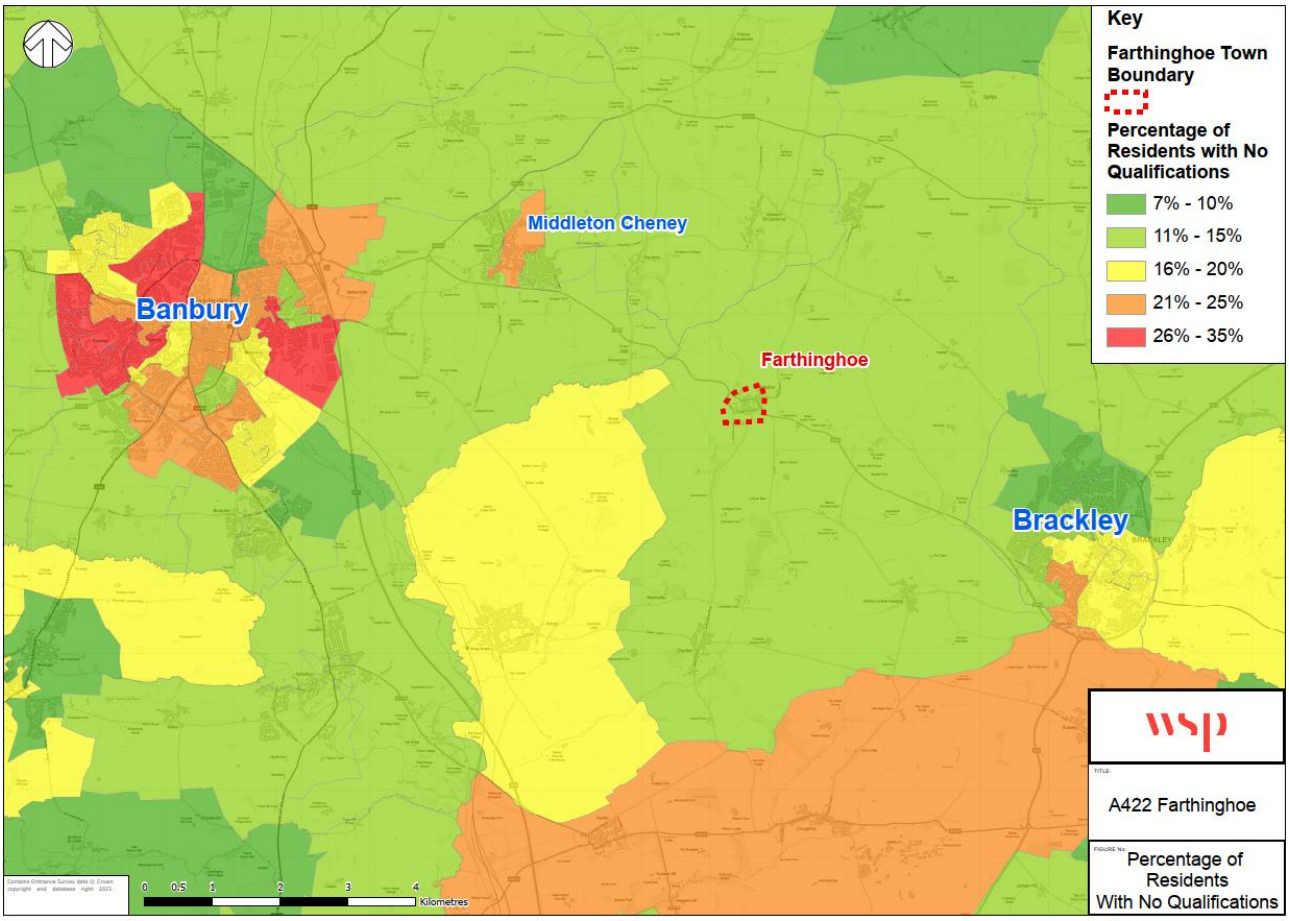
Source: English Indices of Multiple Deprivation (2019)

Figure 3-7 - Indicies of Multiple Deprivation

3.5 EDUCATION

Figure 3-8 shows the percentage of the population with no qualifications. 12% of residents of Farthinghoe and the surrounding area don't have formal qualifications. This is a lower portion than the national percentage without qualification (18%) as well as the regional averages of 14% and 17% for Oxfordshire and West Northamptonshire respectively.

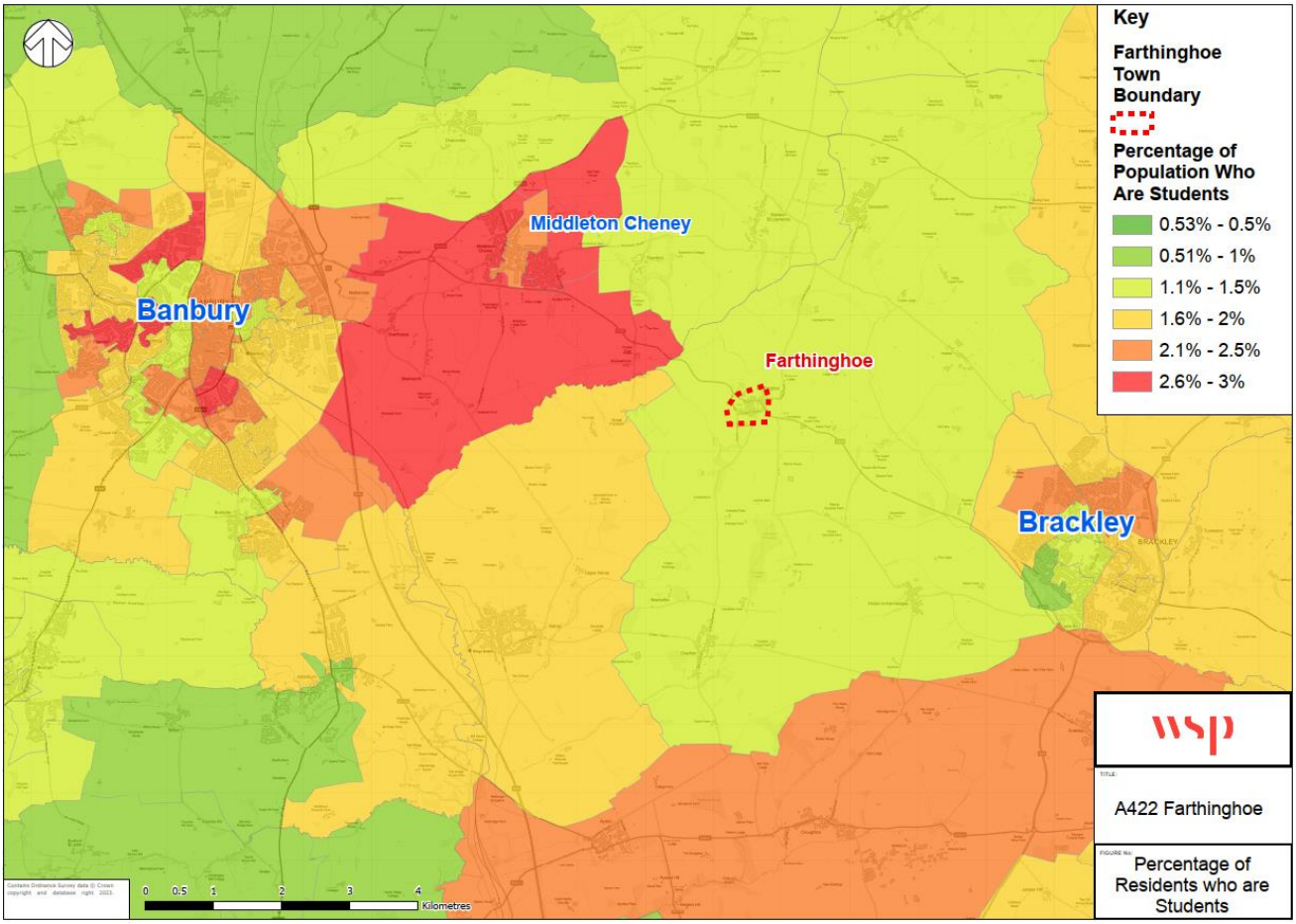
Within the study area, Banbury has several areas within the town where up to 35% of residents don't have formal qualifications. There is also an area southwest of Brackley where between 21% and 25% of residents have no formal qualifications.



Source: ONS Census 2021

Figure 3-8 - Percentage of the population with no qualifications

Figure 3-9 shows the percentage of full-time students and the location of higher education institutions. As shown, the greater percentage of students can be found in the areas around Banbury and Middleton Cheney. The rural area containing Farthinghoe has a lower percentage of residents, whilst Brackley is between the two.



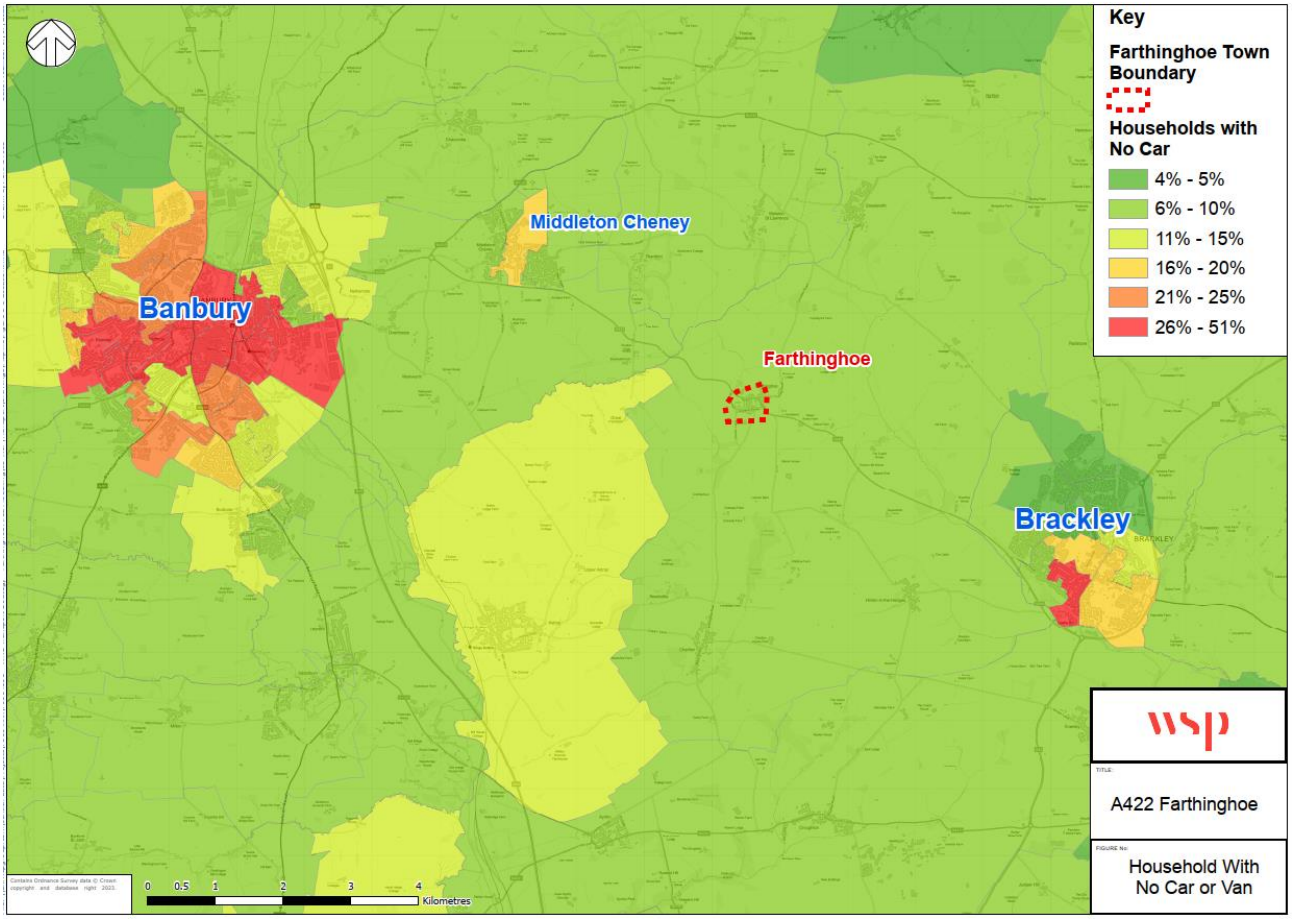
Source: ONS Census 2021

Figure 3-9 - Student Population

4 CONNECTIVITY

4.1 CAR AVAILABILITY

Figure 4-1 shows the car availability by LSOA. The majority of households in Farthinghoe (93%) and the surrounding rural area have access to at least one car or van. Car ownership falls in Banbury and Brackley, which both have areas where between 26% and 51% of households have no car or van access.



Source: ONS Census 2021

Figure 4-1 - Car Availability

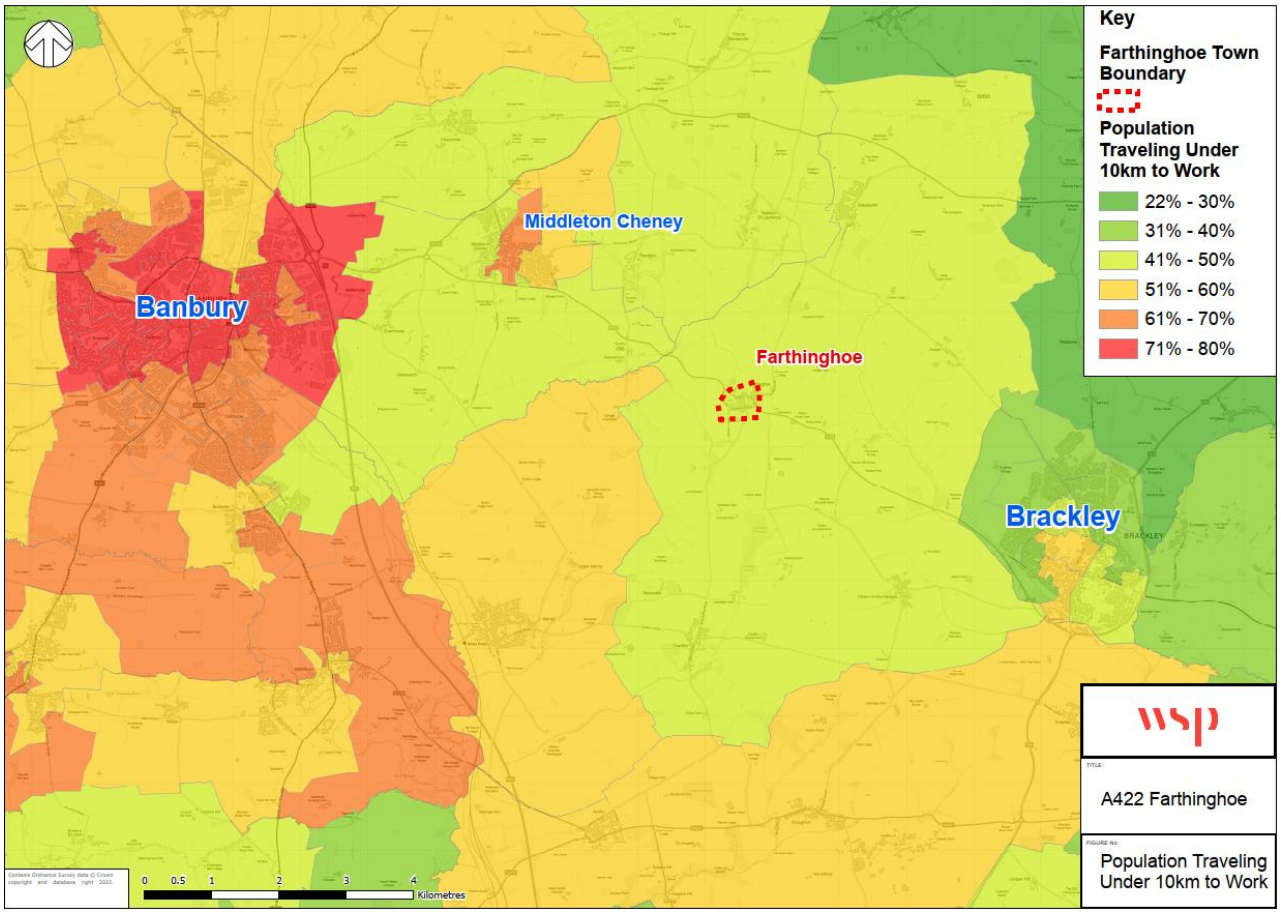
4.2 TRAVEL TO WORK DATA

4.2.1 DISTANCE TO WORK

For travel to work distances, percentages were calculated as a portion of those actually travelling to work, discounting those working from home. This is due to the 2021 Census data taking place during Covid 19 lockdowns, leading to an above-average portion of people working from home which would have skewed the data if included.

Figure 4-2 shows the proportion of residents who travel under 10km to work according to the 2021 census. 46% of residents of Farthinghoe and the surrounding area travel less than 10km to work.

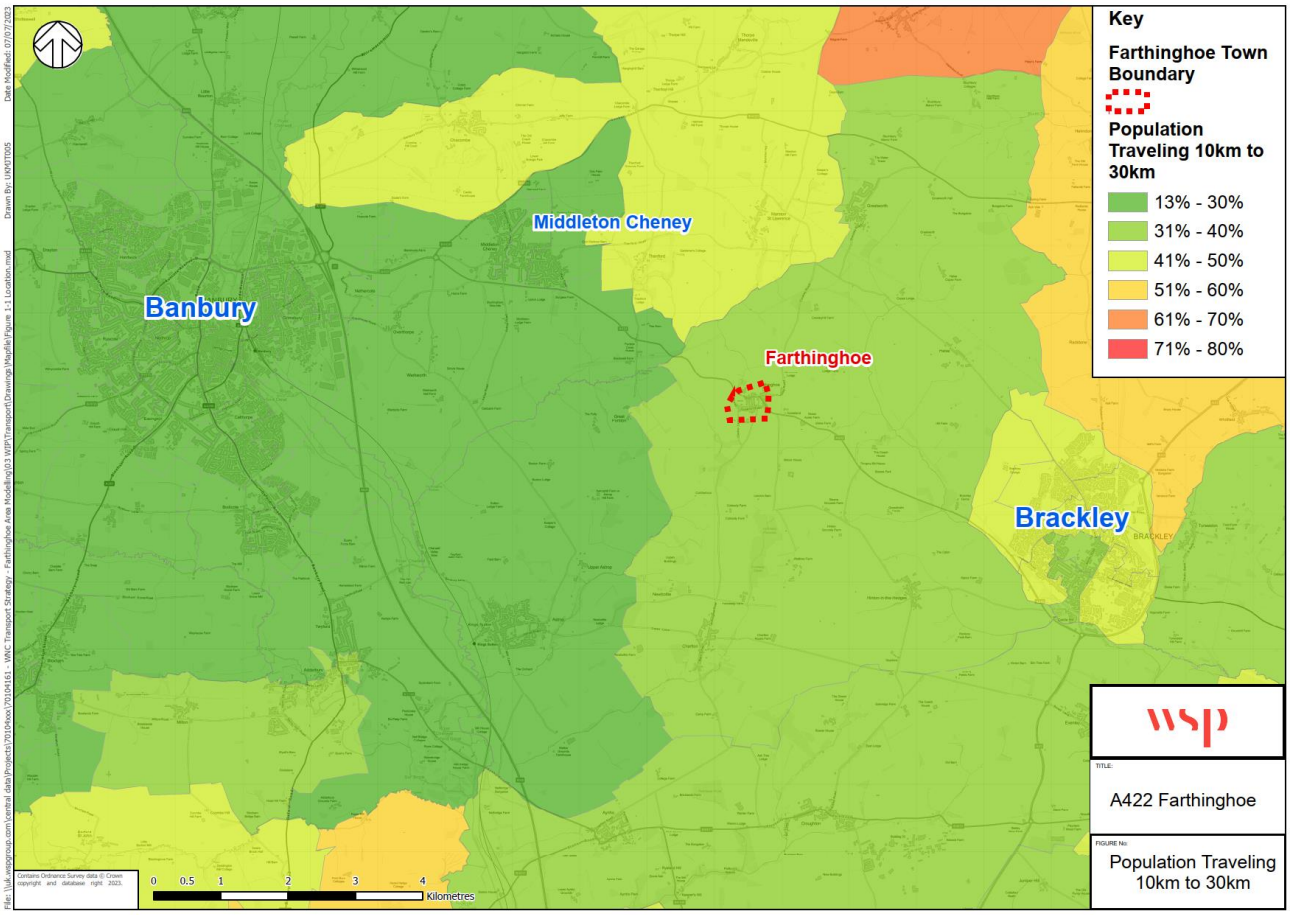
This distance includes the centre of both Banbury and Brackley. The portion of residents travelling less than 10km to work increases in Banbury and its hinterland, identifying the town as a key employment centre within the region.



Source: ONS Census 2021

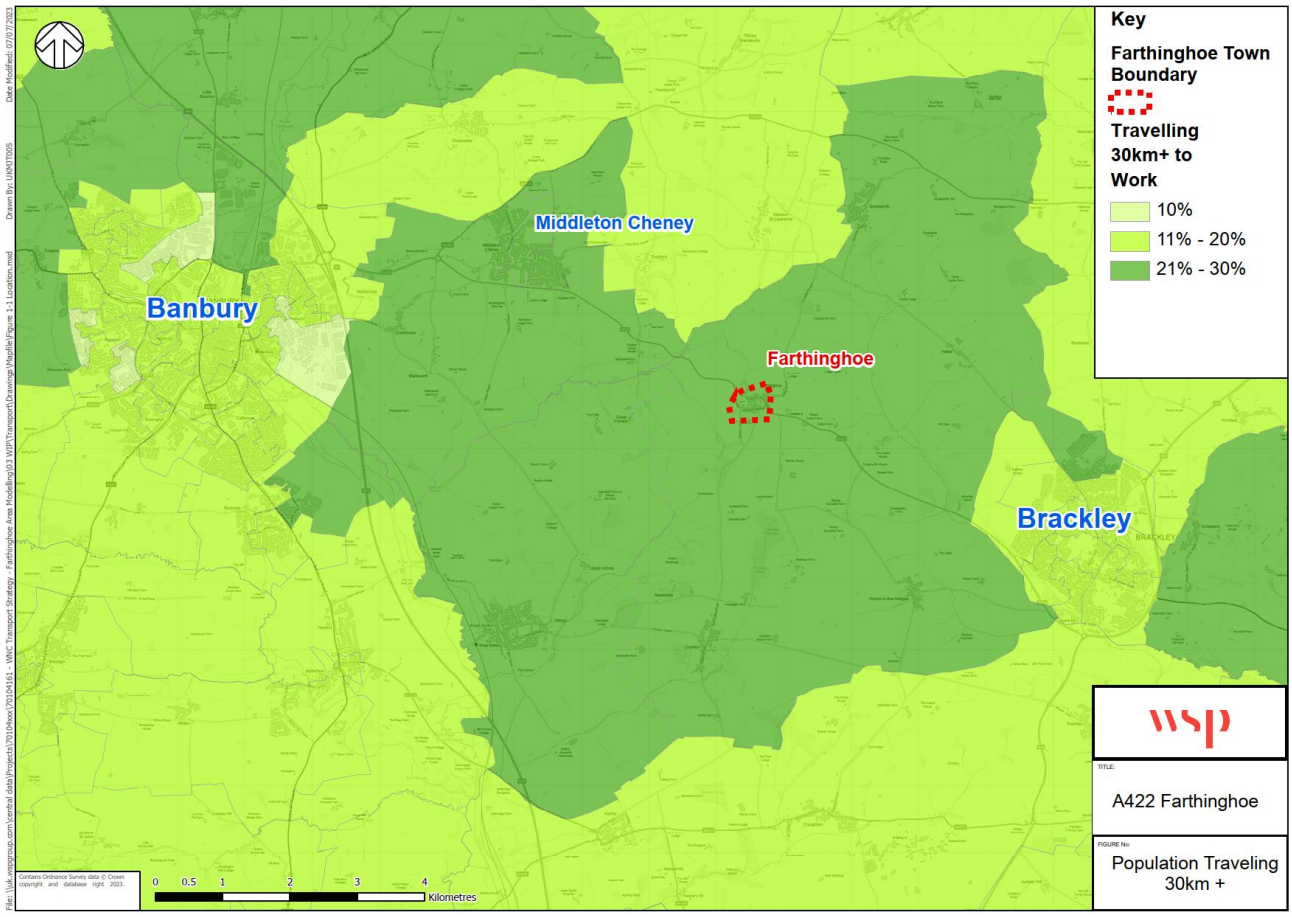
Figure 4-2 - Travel to Work under 10km

Figure 4-3 shows the proportions of the population who travel between 10km and 30km to work. Farthinghoe and the surrounding rural areas have 31-40%, Banbury and Middleton Cheney is much lower at 13-30% while Brackley is higher at 41-50%.



Source: ONS Census 2021

Figure 4-3 - Travel to Work 10km - 30km



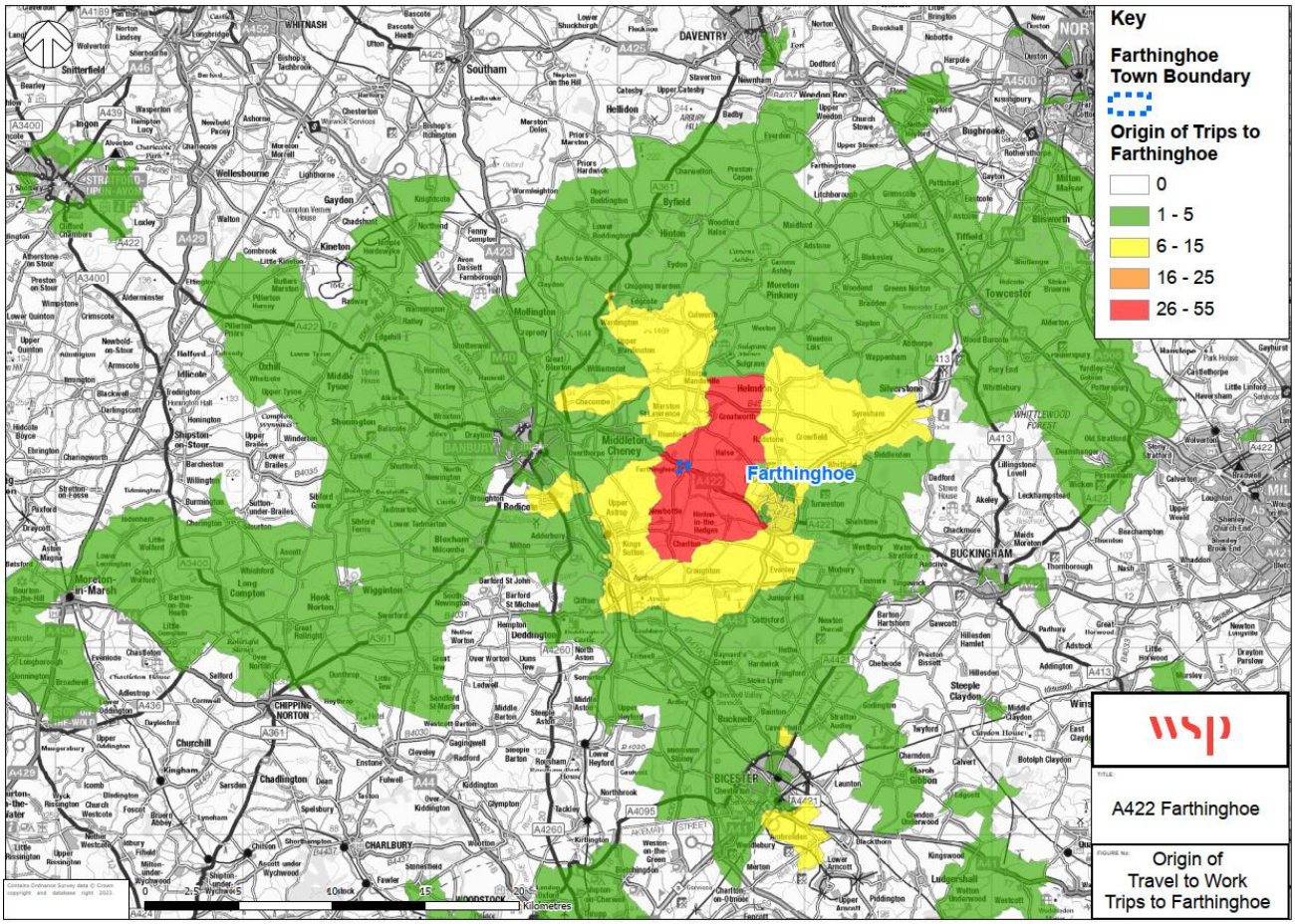
Source: ONS Census 2021

Figure 4-4 - Travel to Work over 30km

4.2.2 PLACE OF WORK

The following Origin Destination data is obtained from the 2011 Census, rather than the 2021 Census used elsewhere in this appraisal unless otherwise noted. This is as the Origin Destination data from the 2021 Census has yet to be published by the Office of National Statistics (ONS). Figure 4-5 to Figure 4-10 show the Origin and Destination for trips for Farthinghoe, Banbury and Brackley.

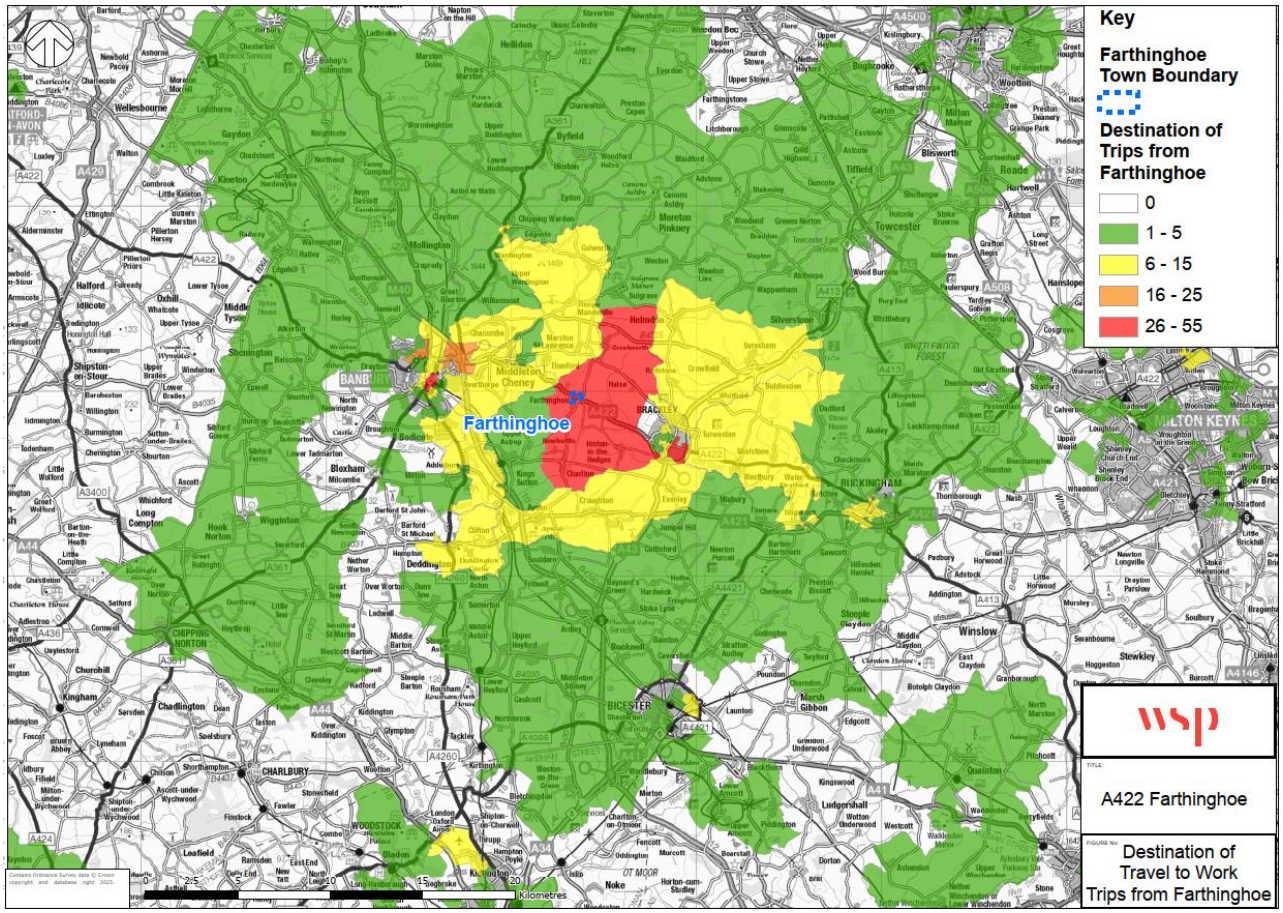
Figure 4-5 shows that a substantial portion of trips into Farthinghoe originate within the same LSOA. These form 12% of trips into the village and its surrounds. The majority of travel to work trips into the LSOA from outside are from the area immediately adjacent, including the neighbouring villages and the town of Brackley. These areas are within circa 5km, placing them in cycling range of Farthinghoe.



Source: ONS Census 2011

Figure 4-5 - Origin to Travel to Work Trips to Farthinghoe

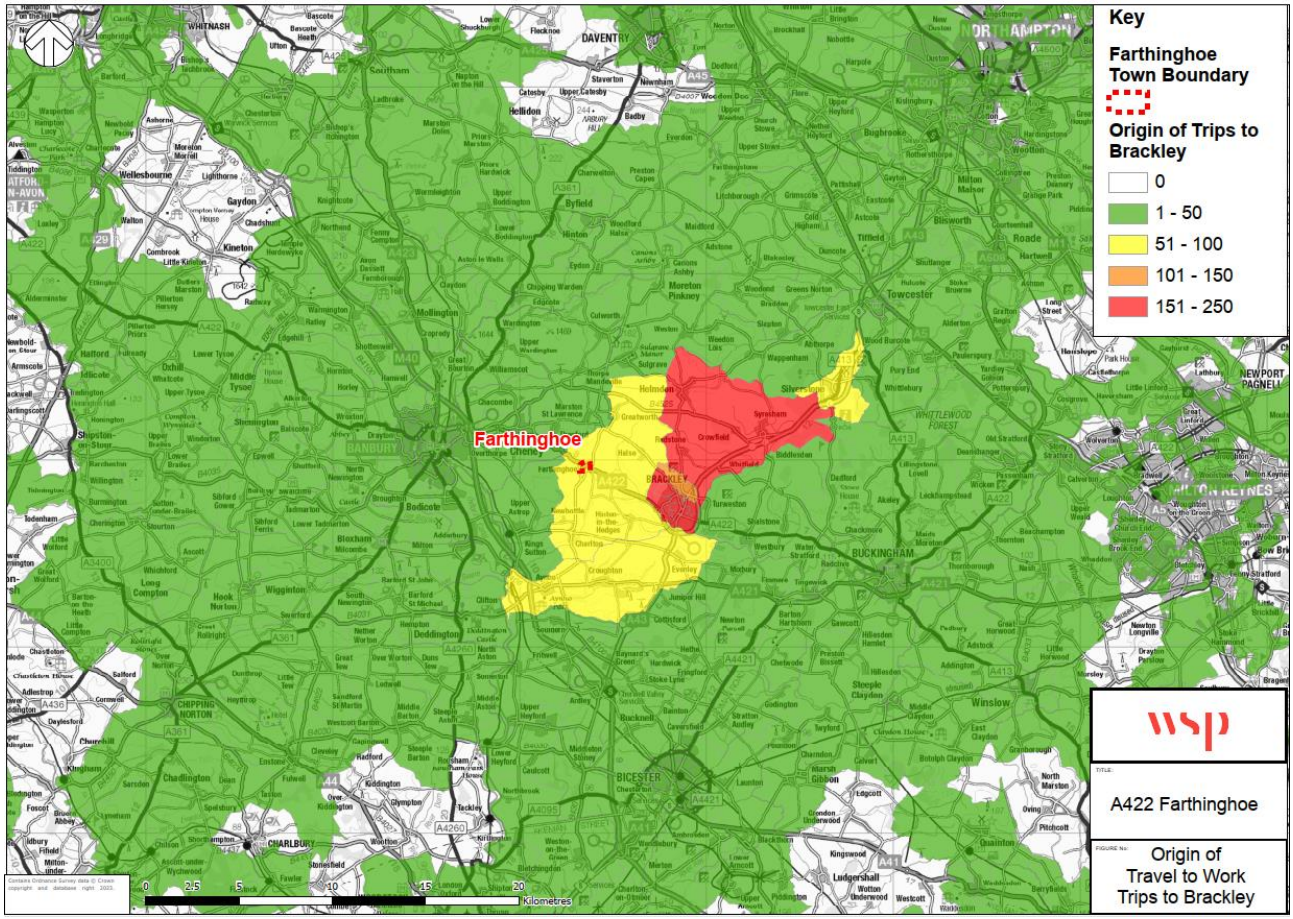
Figure 4-6 shows the primary destinations of trips from Farthinghoe are Banbury and Brackley. There is also a substantial number of trips from the village and its surrounds which end within the same LSOA, as previously mentioned. Some trips go further afield, including Milton Keynes.



Source: ONS Census 2011

Figure 4-6 - Destination of Trips from Farthinghoe

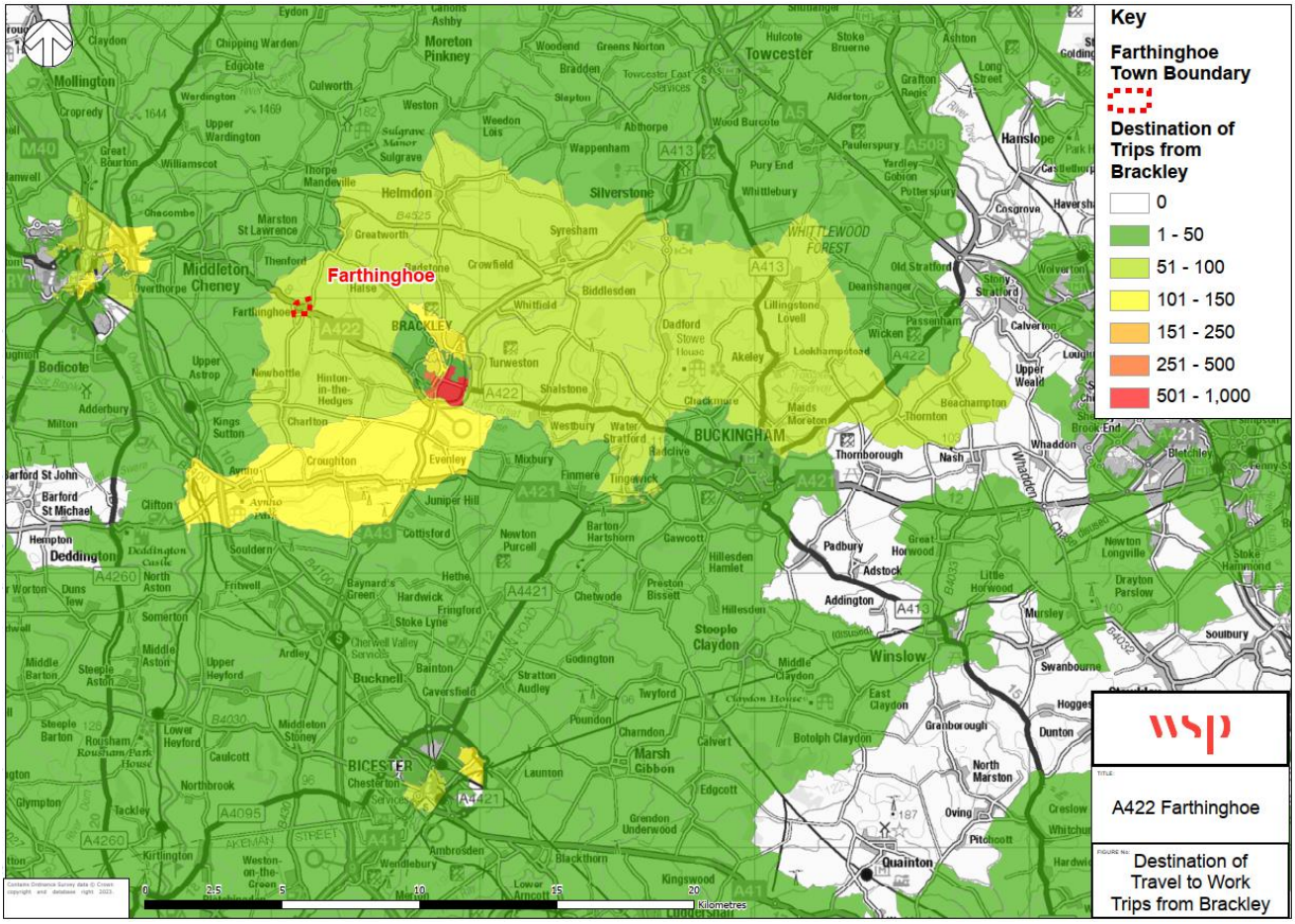
Figure 4-7 shows that the majority of travel to work trips into Brackley originate within the town itself. This is followed by the LSOAs to its north and west, including Farthinghoe.



Source: ONS Census 2011

Figure 4-7 - Origin of Trips to Brackley

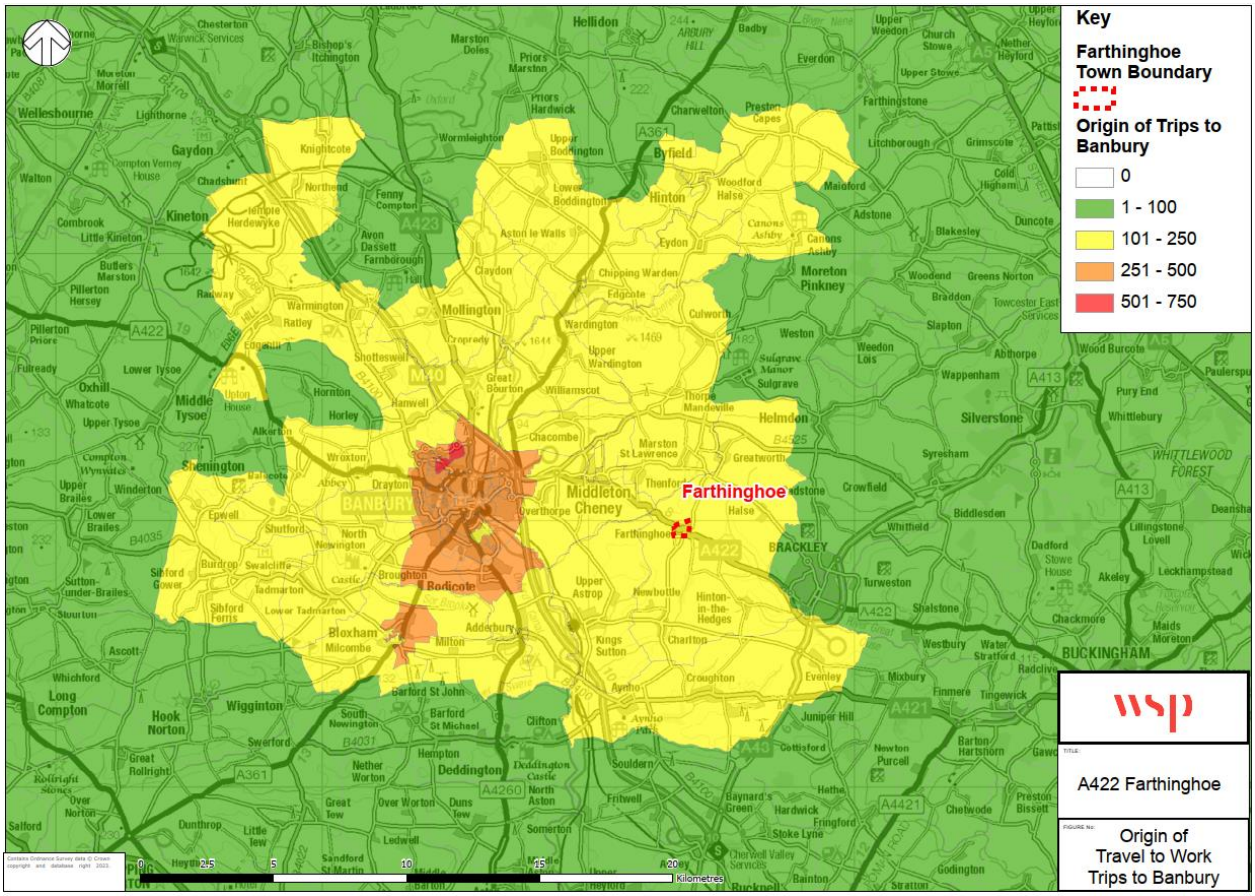
Figure 4-8 shows a substantial portion of Brackley's residents work (30%) work within the town itself. Other notable destinations include Banbury (circa 11% of trips) and Bicester. The remainder of trips are more widely distributed, including some into the LSOA containing Farthinghoe.



Source: ONS Census 2011

Figure 4-8 - Destination of Travel to Work Trips from Brackley

Figure 4-9 shows that the majority of trips into Banbury (circa 46%) originate within the town itself. This is followed by the villages and towns forming the town's wider hinterland, including Farthinghoe.

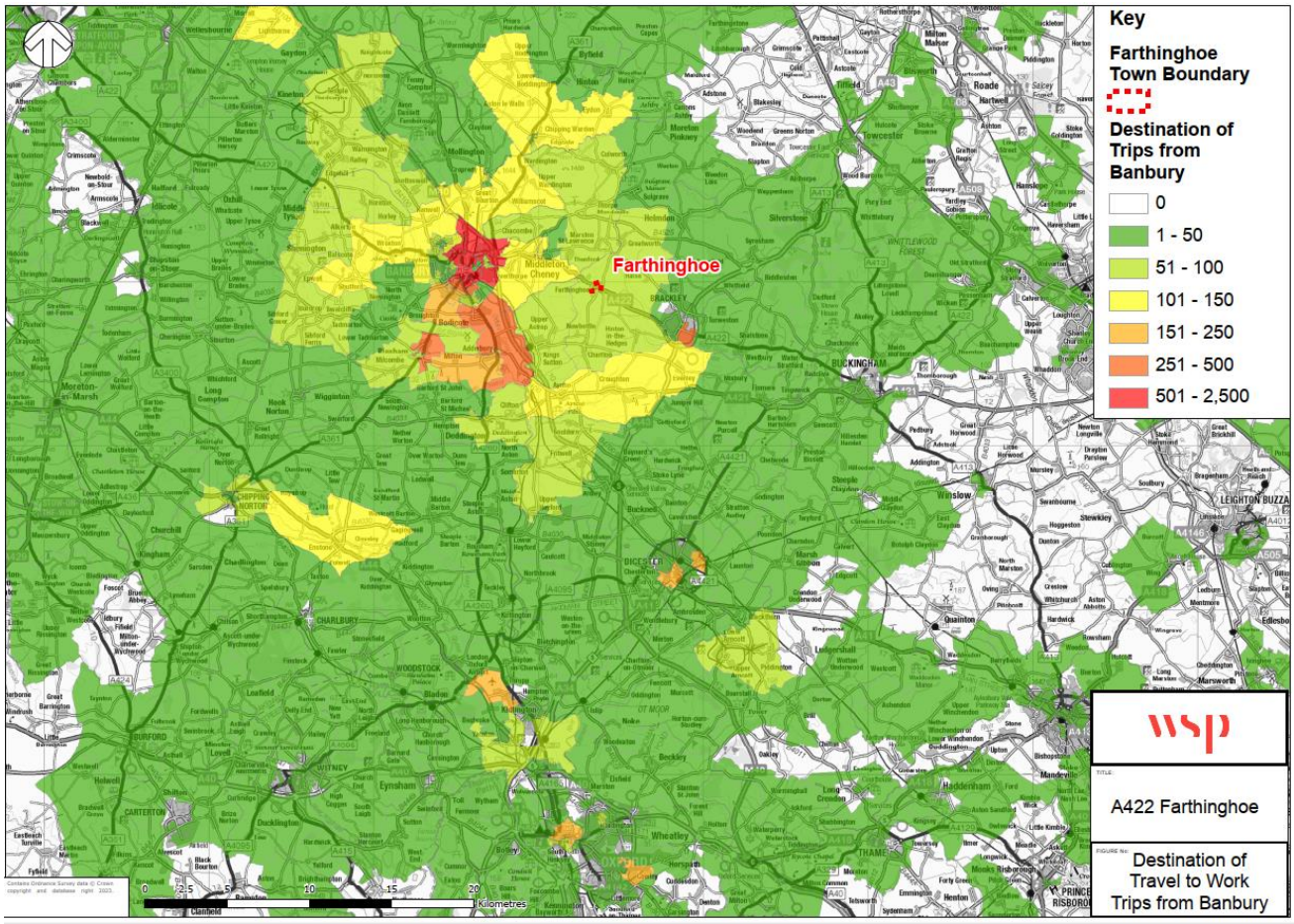


Source: ONS Census 2011

Figure 4-9 - Origin of Travel to Work Trips in Banbury

Figure 4-10 shows that 60% of trips from Banbury end within the town itself. This is followed by the town's hinterland, particularly to the south. Locations south of the town comprise circa 3% of trips. Other notable destinations include Brackley (circa 2%) and Bicester (circa 3%). There are also a notable number of trips south from the town, in the direction of Oxford.

``

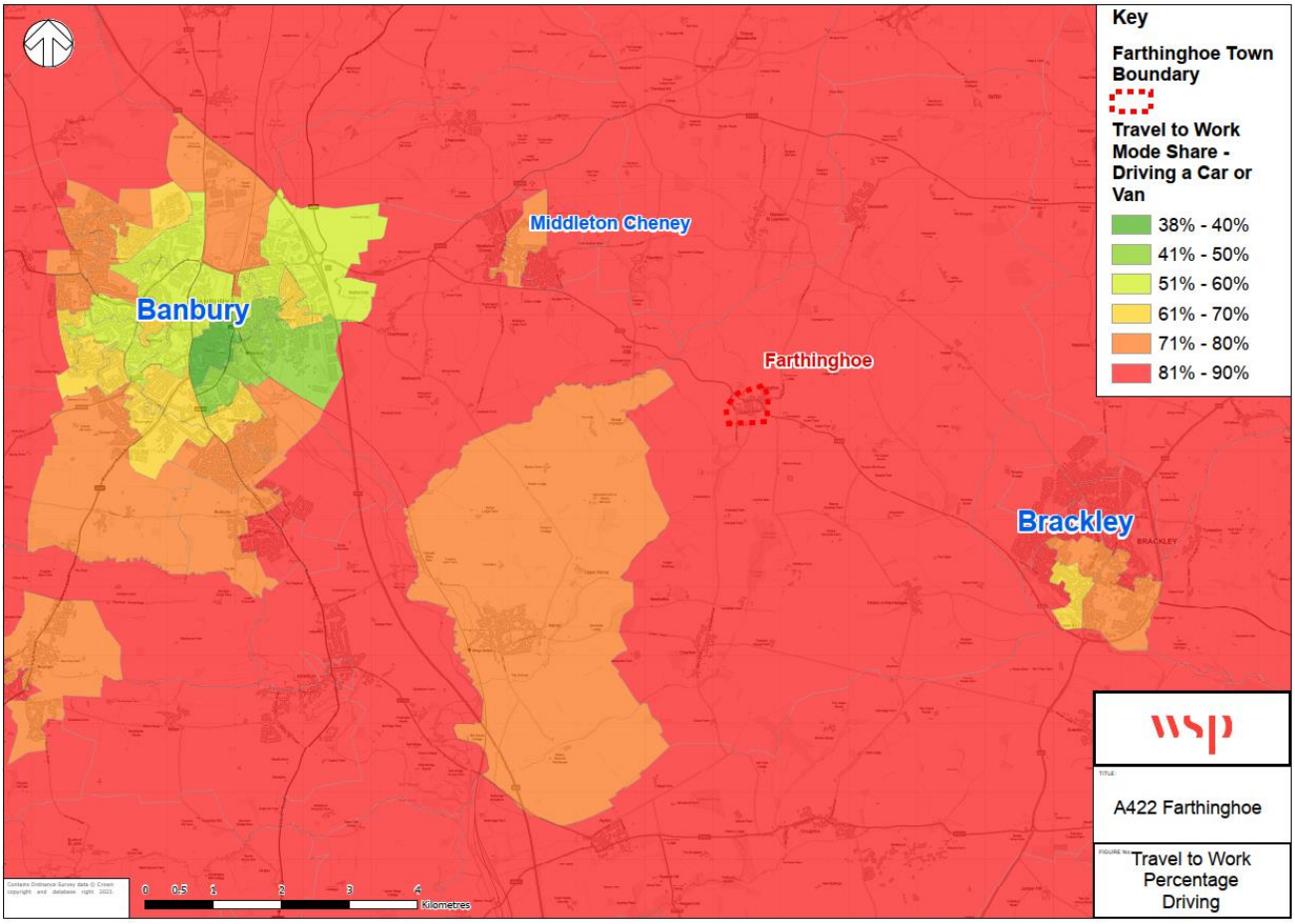


Source: ONS Census 2011

Figure 4-10 - Destination of Travel to Work Trips from Banbury

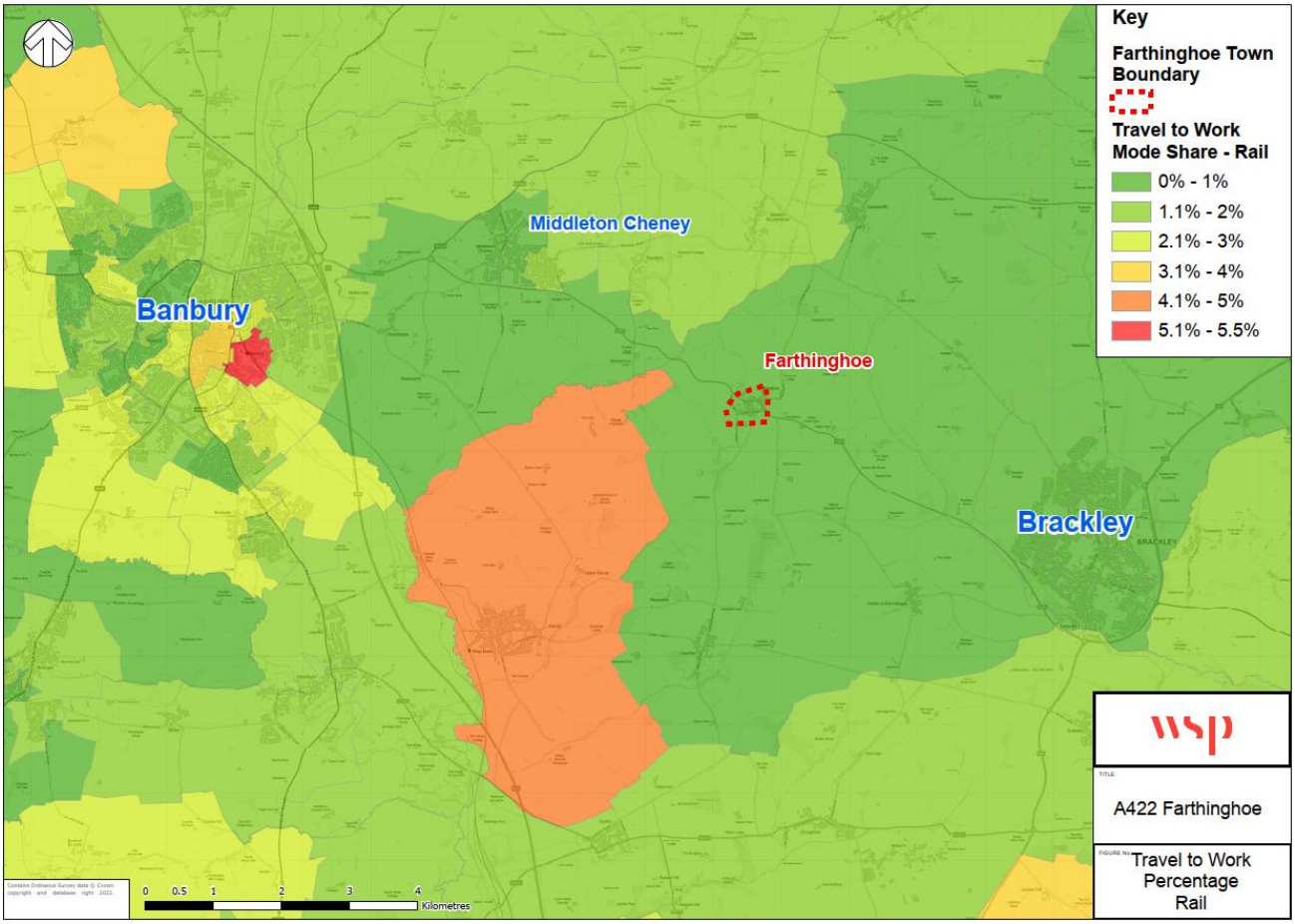
4.2.3 MODE SHARE

Figure 4-11 to Figure 4-15 on the following pages display census 2021 travel to work data according to mode travel to work.



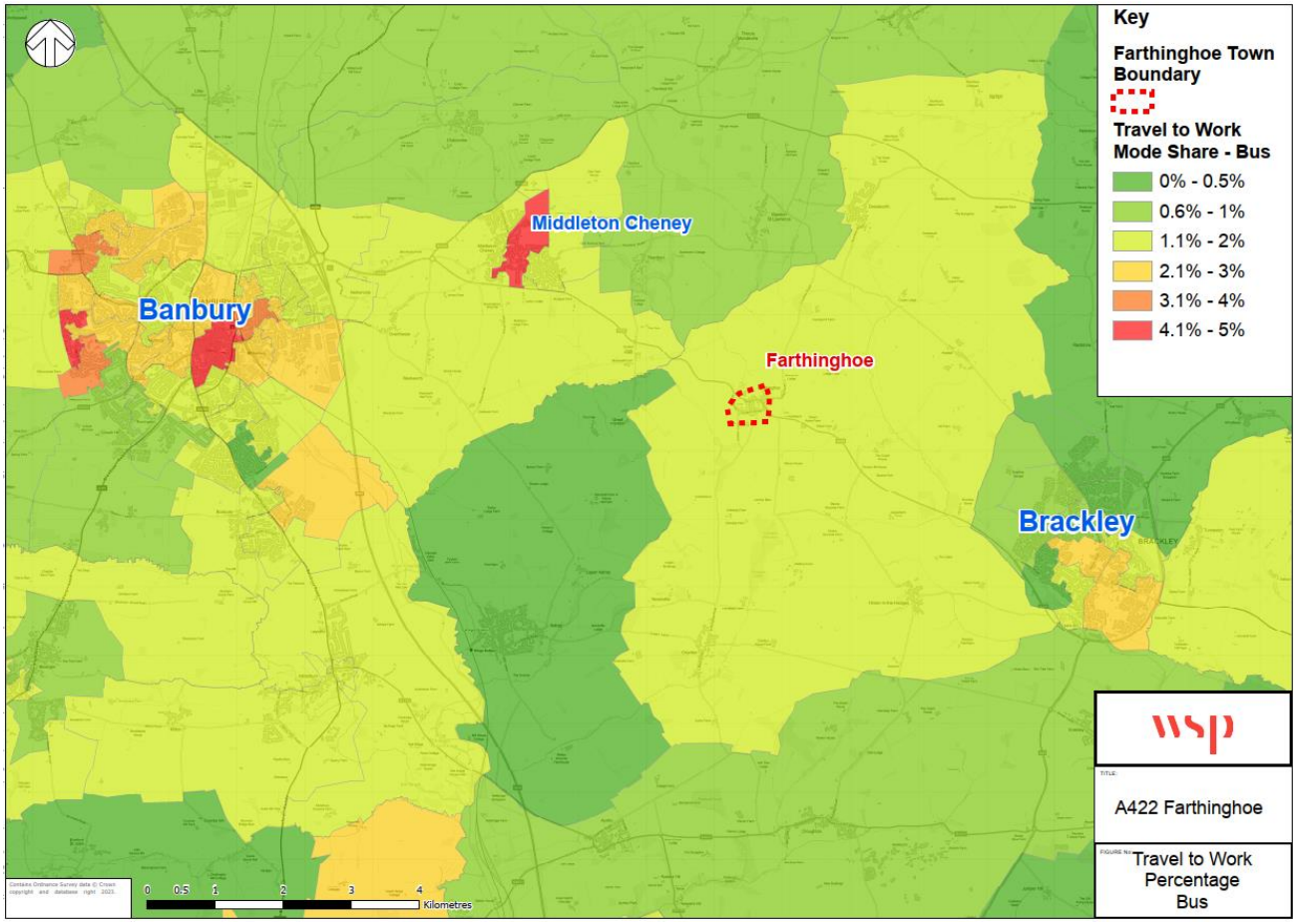
Source: ONS Census 2021

Figure 4-11 - Travel to Work – Car



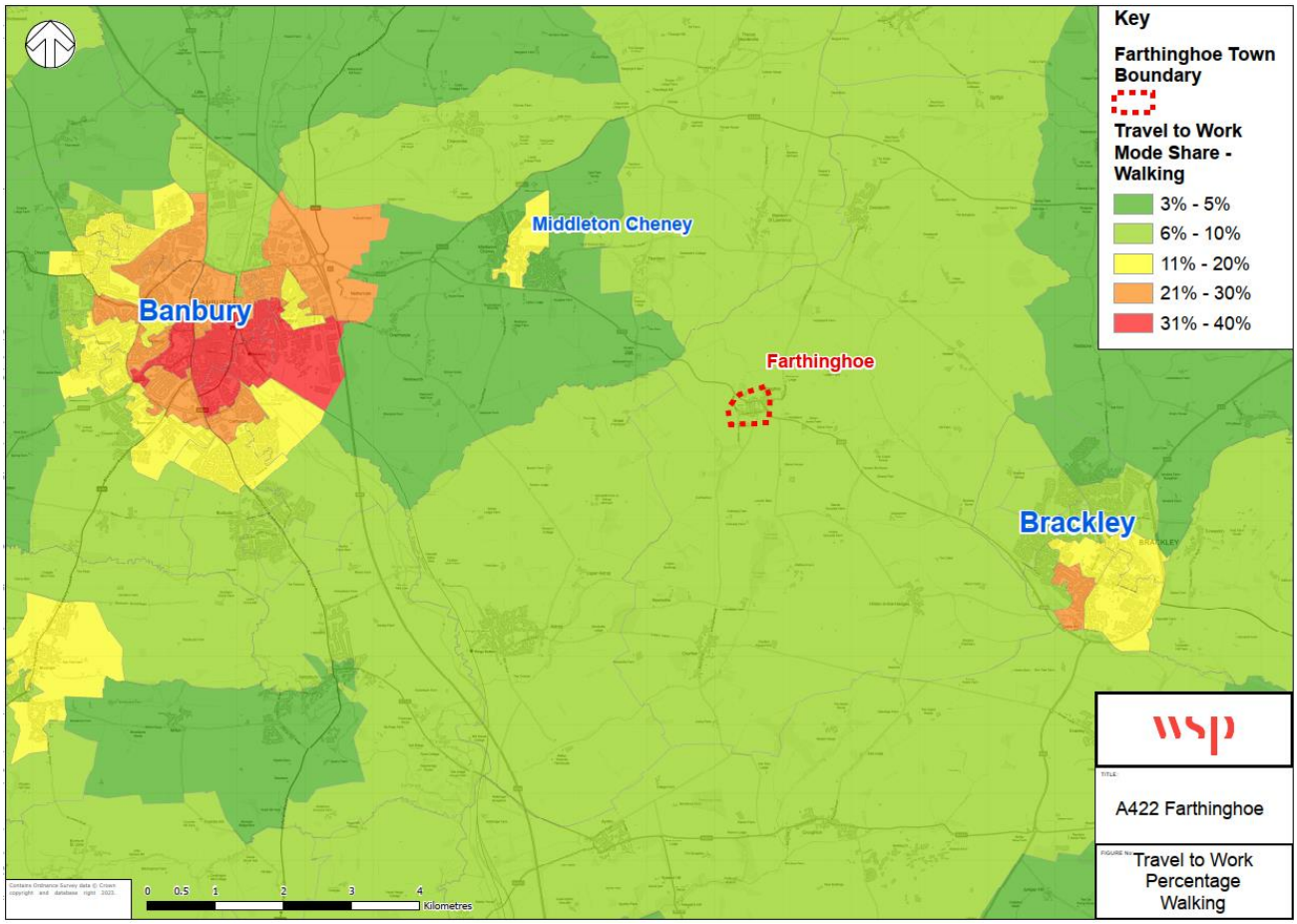
Source: ONS Census 2021

Figure 4-12 - Travel to Work – Rail



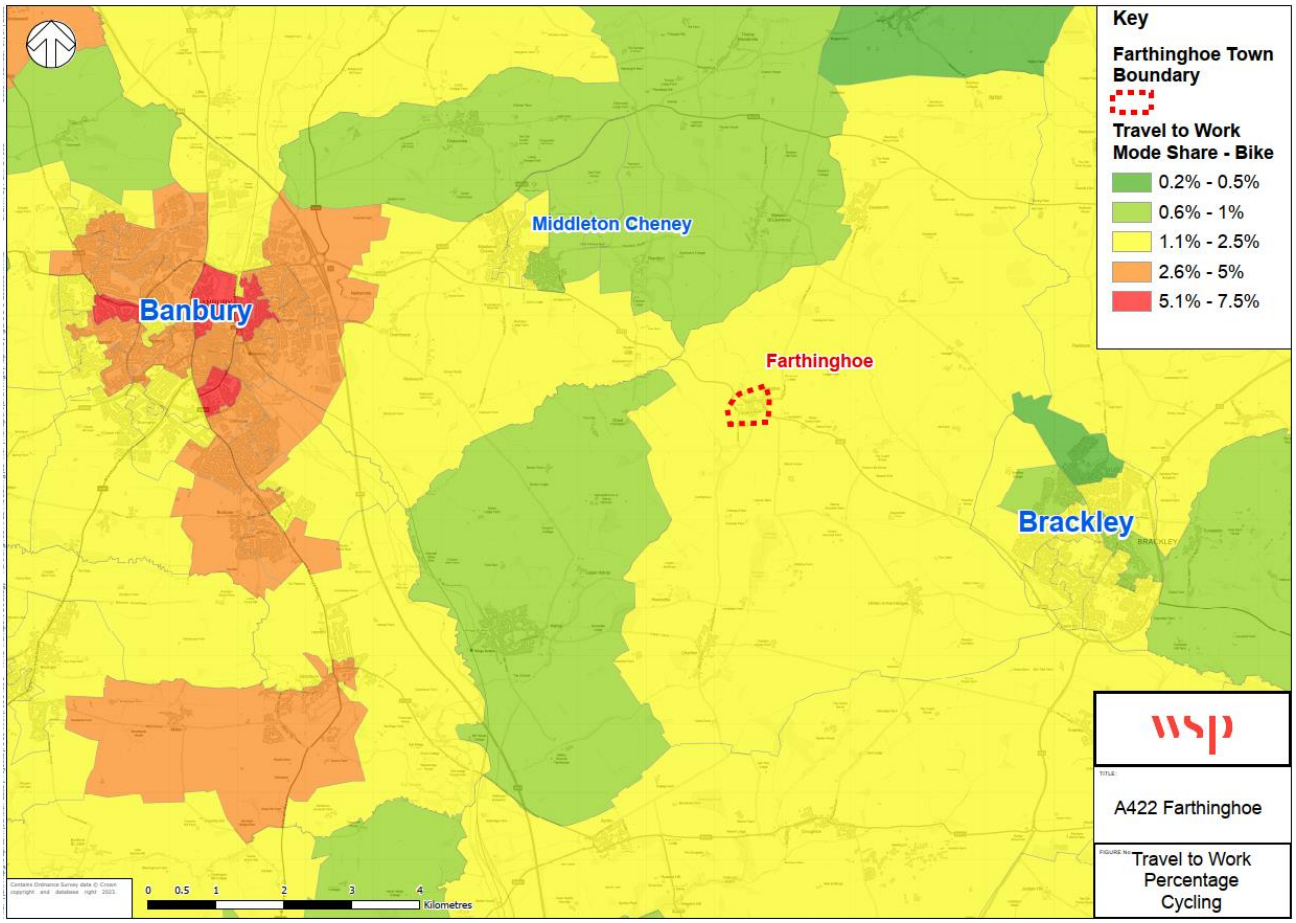
Source: ONS Census 2021

Figure 4-13 - Travel to Work – Bus



Source: ONS Census 2021

Figure 4-14 - Travel to Work – Walking



Source: ONS Census 2021

Figure 4-15 - Travel to Work - Cycling

Figure 4-11 to Figure 4-15 demonstrate the following:

- Figure 4-11 shows that outside of the larger towns (Banbury and Brackley) the majority of the study area has a car mode share between 81% and 90%. The LSOA containing Farthinghoe has an 84% car mode share. The lowest car mode share in the study area is Banbury where the town centre has a 38-40% car mode share, reflecting the greater portion of jobs available within reach of walking, cycling or public transport. The rural parts of the study area have a greater car mode share than the national and Oxfordshire average of 65%, as well as the west Northamptonshire average of 74%.
- Figure 4-13 shows circa 1% of residents in the LSOA containing Farthinghoe use buses to travel to work. A similar percentage is reflected on the other main road corridors where bus services operate. In the wider rural areas with less bus services, the percentage using bus drops to 0%-1%. This is less than the national average of 6% as well as less than the wider regional bus mode shares of 5% for West Northants and 6% for Oxfordshire. The largest bus mode shares within the study area are recorded in central Banbury and Middleton Cheney, where some LSOAs have 4.1%-5% of residents travelling to work by bus.
- Figure 4-12 shows less than 1% of residents in Farthinghoe and the surrounding area use rail, considerably less than the national average of 6%, though similar to the regional mode share of circa 1%. The low mode share for Farthinghoe and Brackley likely reflects the distance from the

nearest railway stations in Banbury and King's Sutton. King's Sutton has a higher rail mode share (4.1%-5%), whilst Banbury has the highest mode share in the study area of 5.1-5.5%, reflecting the range and frequency of train services available in the town.

- Figure 4-14 shows 7% of those living in Farthinghoe and the surrounding LSOA walk to work. This is slightly above some of the surrounding rural areas, however is lower than the national average of 11%. A greater portion of residents of Banbury (up to 40% in some areas) walk to work, presumably within the town. Brackley also shows 11%-30% of residents walking to work, above the national average. Oxfordshire's walking mode share is 11%, whilst Northamptonshire's is 14%.
- Figure 4-15 shows Circa 1.1% of residents of Farthinghoe's residents travel to work by bike, below the national average of 3%. The rural area west of Farthinghoe records a lower cycling mode share between 0.6 and 1%, whilst the lowest cycle mode share is in northwest Brackley where between 0.2 and 0.5% of residents cycle to work. Banbury has a considerably higher portion of cyclists, between 2.6% and 7.5%.

4.3 NETWORK OVERVIEW

Figure 4-16 displays the A-roads, B-roads and motorways surrounding Fathinghoe. West of the village, the A422 connects with the M40 J11 east of Banbury, where it also connected end on with the A423. These routes provide connections towards Birmingham, Coventry and Leamington Spa.

East of Farthinghoe, the A422 connects with the A43 around Brackley. This provides connections northbound towards Northampton and the M1, southbound towards Bicester and M40 J10 and east via the A421 to Milton Keynes.

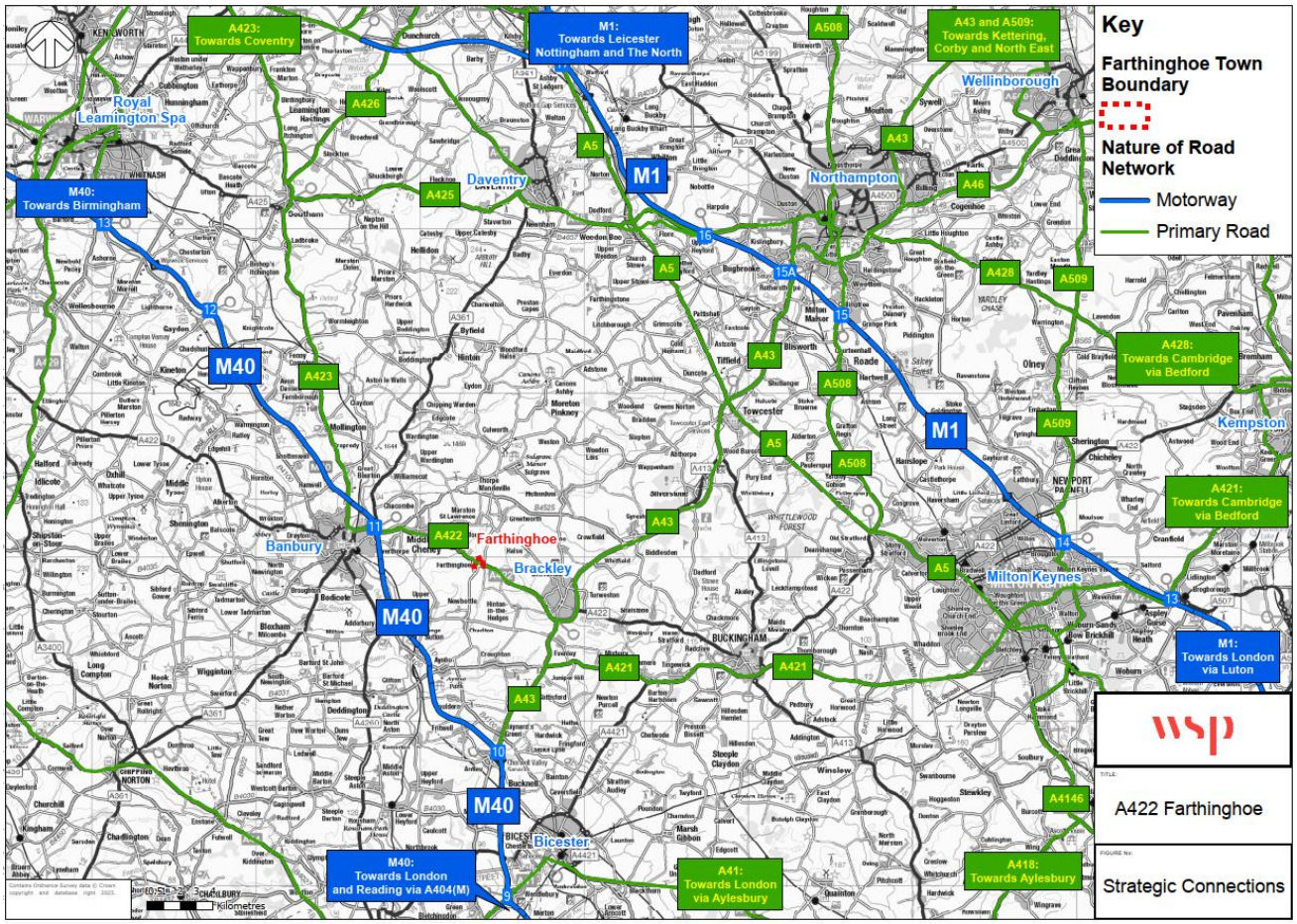


Figure 4-16 - Major Roads

Level 2
100 Wharfside Street
Birmingham
B1 1RT

wsp.com

Appendix B

NOISE ASSESSMENT NOTE

Farthinghoe Bypass – Noise Economic Appraisal

DATE:	11 August 2023		
SUBJECT:	Noise Economic Appraisal		
PROJECT:	Farthinghoe Bypass	**AUTHOR:**	
CHECKED:		**APPROVED:**	

WSP has been instructed to undertake an economic noise appraisal for two alignment options for a bypass scheme around Farthinghoe, West Northamptonshire.

Method

The noise appraisal has been undertaken based on TAG Unit A3[1]. This guidance defines the approach for appraising road traffic noise based on the monetisation of the change in day and night-time noise levels at residential properties.

With reference to Design Manual for Roads and Bridges (DMRB) LA 111[2], a study area approximately 600m around Farthinghoe village and the bypass option alignments has been adopted. The study area is shown in Figure 1.

The assessment is based on the following traffic data scenarios:

- Do-Minimum Opening Year (DMOY) – scenario without the scheme in 2027
- Do-Minimum Opening Year (DMFY) – scenario without the scheme in 2041
- Northern V0 Do-Something Opening Year (DSOY) – scenario with the scheme in 2027
- Northern V0 Do-Something Future Year (DSFY) – scenario with the scheme in 2041
- Northern V1 Do-Something Opening Year (DSOY) – scenario with the scheme in 2027
- Northern V1 Do-Something Future Year (DSFY) – scenario with the scheme in 2041

In line with TAG Unit A3, the following comparisons form the basis of the economic appraisal:

- Northern V0 DSOY vs. DMOY
- Northern V0 DSFY vs. DMFY
- Northern V1 DSOY vs. DMOY
- Northern V0 DSFY vs. DMFY

Noise Model

A noise model has been built using proprietary 3D software, CadnaA (2023). The noise model incorporates a number of data sources and is configured to calculate in accordance with DMRB and CRTN, noise model sources and settings are given in Table 1 below.

---

[1] Department for Transport (2023). TAG Unit A3, *Environmental Impact Appraisal* [online] Available at: TAG unit A3 environmental impact appraisal - GOV.UK (www.gov.uk). Accessed August 2023.

[2] Highways England (2020). Design Manual for Roads and Bridges. LA 111 *Noise and vibration.* Revision 2 [online] Available at: LA 111 - Noise and vibration (standardsforhighways.co.uk). Accessed August 2023.

Farthinghoe Bypass – Noise Economic Appraisal

DATE:	11 August 2023		
SUBJECT:	Noise Economic Appraisal		
PROJECT:	Farthinghoe Bypass	**AUTHOR:**	
CHECKED:		**APPROVED:**	

Table 1 – Noise model details

Parameter	Source / setting / description
Software / version	CadnaA / 2023
Calculation method	DMRB / CRTN
Traffic data*	WPS traffic engineers / Annual Average Weekday Traffic (AAWT) 18h
Ground levels: existing	LiDAR composite DTM 1m
Ground levels: scheme	WSP engineering 3D drawings
Ground absorption	Global setting: soft ground
Bypass road alignment	WSP engineering 3D drawings
Existing road alignment	OS MasterMap
Building footprints	OS MasterMap
Building heights	6.0m for building areas >25m^2, 3.0m for building area ≤25m^2
Building receivers	1.5m and 4.0m above ground, 1.0m in front of facade
Address data	Local Land & Property Gazetteer (LLPG)
Barriers / screening	Existing barriers are not included, e.g., boundary fences/walls
* Speed pivoting of traffic speeds is not applied.	

The noise model only includes road traffic noise sources, meaning that all other man-made and natural sources such as aircraft, agricultural vehicles, domestic noise, trees/leaves rustling, and birdsong are not included.

In line with CRTN, only roads with an AAWT,18h (06:00 – 00:00) vehicle flow of equal to or greater than 1,000 vehicles are calculated in the noise model. This has resulted in a number of road links being omitted from the modelled scenarios, for example, in the do-something (with the scheme) scenarios a number of sections of Main Road (A422) are omitted, this is the main road through Farthinghoe village that is being bypassed.

Where road links are omitted, because the vehicle flows fall outside the CRTN calculation parameters, there is potential that the reduction in noise level will be over predicted.

Farthinghoe Bypass – Noise Economic Appraisal

DATE:	11 August 2023		
SUBJECT:	Noise Economic Appraisal		
PROJECT:	Farthinghoe Bypass	**AUTHOR:**	
CHECKED:		**APPROVED:**	

The modelled and omitted road links for each scenario are shown in Figures 2 to 4. Figure 2 shows the do-minimum scenario, Figure 3 shows the Northern V0 do-something scenario, and Figure 4 shows the Northern V1 do-something scenario.

For each scenario, daytime ($L_{A10,18h}$) road traffic noise levels are predicted at the residential properties within the study area.

Night-time (L_{night}) road traffic noise levels are generated by applying the TRL[3] 'Method 3' equation:

- $L_{night} = 0.9 \times L_{A10,18h} - 3.77$

For each comparison, the residential property façade result exhibiting the greatest magnitude of noise change is identified. These results are then imported into the TAG Unit A3 Noise Workbook. In line with TAG Unit A3, the daytime values are converted to $L_{Aeq,16h}$ using the equation:

- $L_{Aeq,16h} = L_{A10,18h} - 2$

The TAG Unit A3 Noise Workbook calculates the monetary valuation of noise impacts and provides an estimation of the affected population.

Results

Northern V0 and Northern V1 bypass alignments both result in net benefit noise changes (i.e. net reduction in road traffic noise). A reduction in noise results in a positive monetary valuation for both bypass alignments. The TAG Unit A3 monetary valuation of noise changes are presented in **Table 2**.

Table 2 – Economic results

Noise Workbook – Monetary valuation of changes in noise impact	Northern V0	Northern V1
Net present value of change in noise	**£1,724,302**	**£1,580,712**
Net present value of impact on sleep disturbance	£751,540	£569,421
Net present value of impact on amenity	£666,483	£694,210
Net present value of impact on acute myocardial infarction	£120,602	£123,005
Net present value of impact on stroke	£73,957	£77,302
Net present value of impact on dementia	£111,719	£116,774
Positive values reflect **net benefits** (i.e. a reduction in noise)		

[3] Transport Research Laboratory. Abbot, P.G. and Nelson, P.M. TRL PR/SE/451/02, 'Converting the UK traffic noise index LA10,18h to EU noise indices for noise mapping'.

In addition, the TAG Unit A3 estimation of affected population are shown in **Table 3**. Most residential properties in the study area experience a reduction in daytime and night-time noise levels due to the introduction of the bypass. A relatively small number of residential properties experience an increase in daytime and night-time noise levels.

Table 3 – Quantitative results

Noise Workbook – Estimation of affected population	Northern V0	Northern V1
Households experiencing **increased daytime** noise in forecast year	16	13
Households experiencing **reduced daytime** noise in forecast year	131	131
Households experiencing **increased night-time** noise in forecast year	7	1
Households experiencing **reduced night-time** noise in forecast year	81	69

Defra Noise Important Areas

Noise Important Areas (NIA) are locations that the Department for the Environment and Rural Affairs (Defra) has identified as containing the 1% of the population that are affected by the highest noise levels. These areas are identified in accordance with the requirements of the EU Environmental Noise Directive and associated English Regulations. NIAs are areas which require potential action to reduce noise levels.

Based on Round 3 of the UK noise mapping project undertaken by Defra, there are three NIAs within the study area, they are shown on Figure 1:

- NIA 8153 located in the centre of Farthinghoe village along Main Road, there are approximately 65 properties in this area.
- NIA 8152 located east of Farthinghoe village on Main Road, there is a single property in this area.
- NIA 8151 located at the eastern edge of the study area on Main Road, there is a single property in this area.

Noise change contour plots are presented in Figure 5 and 6, Figure 5 displays the noise change resulting from the introduction of Northern V0 (Northern V0 DSOY vs. DMOY). Figure 6 displays the noise change resulting from the introduction of Northern V1 (Northern V1 DSOY vs. DMOY).

The traffic data shows that the introduction of the bypass will reduce the number of vehicles travelling through Farthinghoe village along Main Road (A422), this results in lower noise levels along this route. As

the properties in Defra NIA 8153 lie along Main Road, these properties experience a reduction in noise levels.

As noted above, some road links have been omitted from the do-something scenarios, because the vehicle flows fall outside the CRTN calculation parameters, in these locations the reduction in noise level will be over predicted.

Noise study area

Defra Noise Important Areas

Bypass option alignments

Northern V0

Northern V1

NIA 8153

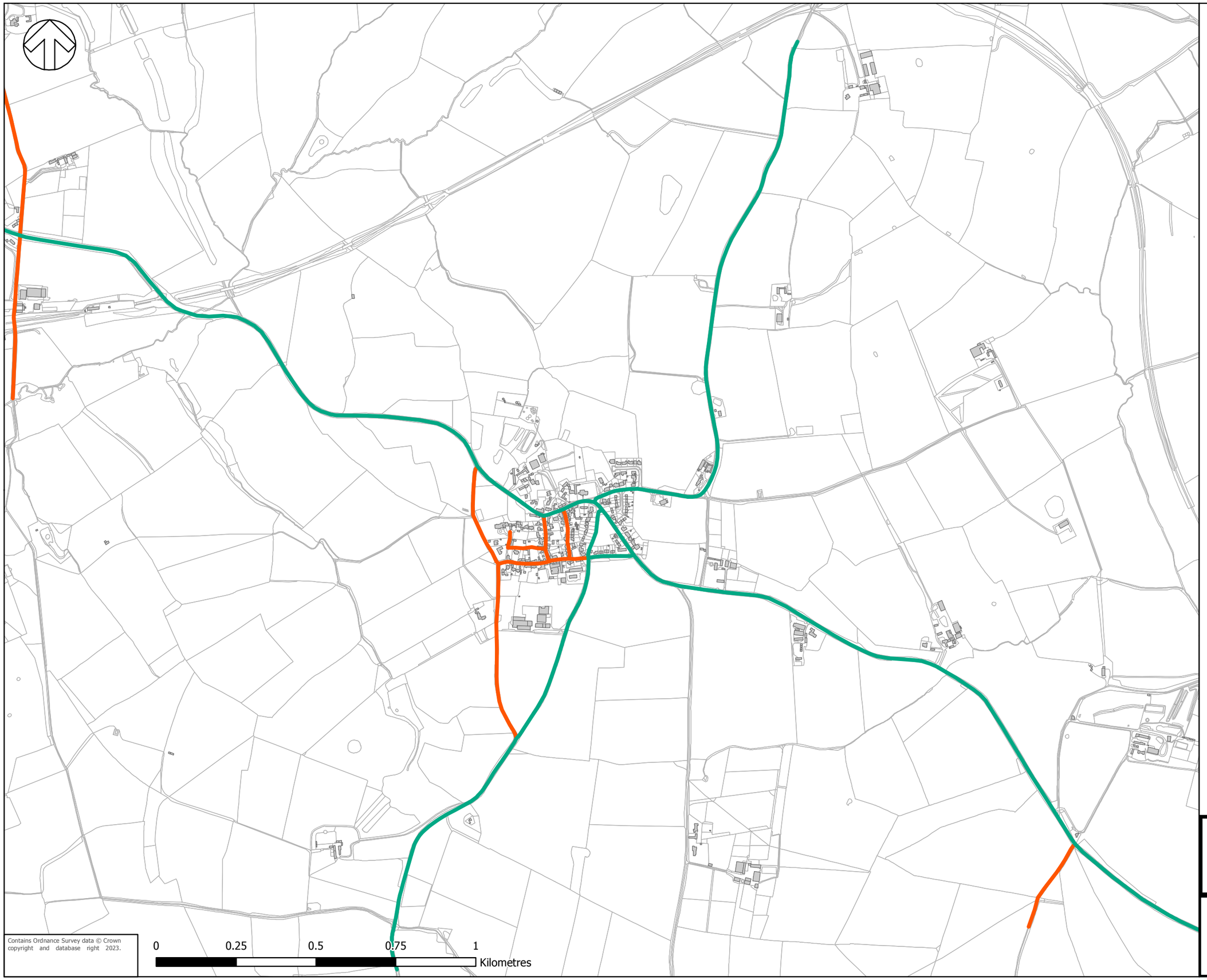
NIA 8152

NIA 8151

0 0.25 0.5 0.75 1 Kilometres

wsp

Figure 1


Do-minimum road links
Modelled
Omitted
Contains Ordnance Survey data © Crown copyright and database right 2023.
0
0.25
0.5
0.75
1
Kilometres

wsp

Figure 2

Northern V0: Do-something road links

- Modelled
- Omitted

0 0.25 0.5 0.75 1 Kilometres

wsp

Figure 3

Northern V1: Do-something road links

- Modelled
- Omitted

0 0.25 0.5 0.75 1 Kilometres

wsp

Figure 4

Noise study area

Defra Noise Important Areas

Noise change contours: V0

DSOY vs. DMOY
dB(A)

- +10
- +5 to +10
- +3 to +5
- -3 to +3
- -3 to -5
- -5 to -10
- -10

Noise contours details
Grid height: 4m
Resolution: 10m x 10m

0 0.25 0.5 0.75 1 Kilometres

wsp

Figure 5

Noise study area

Defra Noise Important Areas

Noise change contour: V1

DSOY vs. DMOY
dB(A)

+10

+5 to +10

+3 to +5

-3 to +3

-3 to -5

-5 to -10

-10

Noise contours details
Grid height: 4m
Resolution: 10m x 10m

0 0.25 0.5 0.75 1 Kilometres

wsp

Figure 6

Appendix C

AIR QUALITY ASSESSMENT NOTE

Farthinghoe Bypass - Air Quality Benefit Cost Ratio

DATE:	19 July 2023	**CONFIDENTIALITY:**	
SUBJECT:	Farthinghoe Bypass - Air Quality Benefit Cost Ratio		
PROJECT:	Farthinghoe Bypass	**AUTHOR:**	
CHECKED:		**APPROVED:**	

METHODOLOGY

WSP has been instructed to undertake an air quality Benefit Cost Ratio appraisal for two options for a bypass scheme around Farthinghoe, West Northamptonshire. The air quality appraisal has been undertaken in accordance with TAG Unit A3[1]. This guidance defines the approach for appraising local air quality based on quantification of the change in concentration of the traffic-related pollutants Nitrogen Dioxide (NO_2) and particulate matter with a diameter of less than 2.5 micrometres ($PM_{2.5}$) at identified sensitive receptors (e.g. residential properties, schools) within 200m of the affected road network associated with the Proposed Scheme.

The study area for the air quality appraisal screening was defined based on Design Manual for Roads and Bridges (DMRB) LA 105 guidance[2]:

- Road re-alignment of 5m or more;
- Daily traffic flows will change by 1,000 AADT;
- Heavy Duty Vehicle (HDV) flows will change by 200 AADT or more;
- A change in speed band; or
- Daily average speed change of 10km/h or more.

In total, there are 166 sensitive receptor locations identified in the air quality study area, comprising 1 primary school and 165 residential dwellings.

Traffic flows were provided for the following scenarios:

- Baseline 2019 – for model verification;
- 'Do Minimum' (DM) 2027 – Opening year without the Proposed Scheme in place;
- 'Do Something' Option 1 (DS1) 2027 – Opening year with the Proposed Scheme (Option 1) in place;

[1] Department for Transport (2023), TAG Unit A3 Environmental Impact Appraisal [online]. Available at: https://www.gov.uk/government/publications/tag-unit-a3-environmental-impact-appraisal. Accessed July 2023.
[2] National Highways (2019), Design Manual for Roads and Bridges, LA 105 Air Quality [online]. Available at: https://www.standardsforhighways.co.uk/search/10191621-07df-44a3-892e-c1d5c7a28d90. Accessed July 2023.

- ‘Do Something’ Option 2 (DS2) 2027 – Opening year with the Proposed Scheme (Option 2) in place;
- Do Minimum’ (DM) 2041 – Design year without the Proposed Scheme in place;
- ‘Do Something’ Option 1 (DS1) 2041 – Design year with the Proposed Scheme (Option 1) in place; and
- ‘Do Something’ Option 2 (DS2) 2041 – Design year with the Proposed Scheme (Option 2) in place.

Vehicle emission factors for use in the assessment have been obtained using the Emission Factor Toolkit (EFT) version 11.0 (published in November 2021) available on the Department for Environment, Food and Rural Affairs (Defra) website[3]. The EFT allows for the calculation of emission factors for NO_x and $PM_{2.5}$ arising from road traffic for all years between 2017 and 2030. For the predictions of future year emissions, the toolkit considers the latest available COPERT[4] factors to account for anticipated advances in vehicle technology and changes in vehicle fleet composition.

For the prediction of potential impacts due to emissions arising from road traffic during the operation of the Proposed Scheme, the dispersion model ADMS Roads (version 5.0.1.3) was used. This model uses detailed information regarding traffic flows on the local road network, surface roughness, and local meteorological conditions to predict pollutant concentrations at specific receptor locations. The model considers the dispersion of NO_x, PM_{10} and $PM_{2.5}$ only. NO_2 concentrations are calculated post-modelling using the NO_x to NO_2 calculator v8.1[5].

In order to reduce the uncertainty associated with predicted concentrations, model verification was carried out following guidance set out in LAQM.TG22[6]. This was done using the Farthinghoe monitoring (location F1) carried out by West Northamptonshire Council in 2019[7]. With no adjustment, the Root Mean Square Error was determined to be 1.8. This indicates that the model performed well within expected parameters, and no adjustment is necessary. As the model has been verified against local monitoring, there can be reasonable confidence in the predicted concentrations.

ASSESSMENT

Option 1

The local air quality assessment has been undertaken and the analysis indicates that there is an overall improvement in local ambient air quality with respect to NO_2 and $PM_{2.5}$ as a result of the Proposed Scheme. **Table 1** and **Table 2** show the concentrations and impacts of the sensitive receptors in the study area as a result of the Proposed Scheme in the opening and design years.

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[3] Defra (2021), Emission Factor Toolkit [online]. Available at: https://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html. Accessed July 2023.
[4] COPERT is a software tool used world-wide to calculate air pollutant and greenhouse gas emissions from road transport. The development of COPERT is coordinated by the European Environment Agency.
5 Defra (2020), NO_x to NO_2 Calculator v8.1 [online]. Available at: https://laqm.defra.gov.uk/air-quality/air-quality-assessment/nox-to-no2-calculator/. Accessed July 2023.
[6] Defra (2022), Local Air Quality Monitoring Technical Guidance (TG.22) [online]. Available at: https://laqm.defra.gov.uk/wp-content/uploads/2022/08/LAQM-TG22-August-22-v1.0.pdf. Accessed July 2023.
[7] West Northamptonshire Council (2022), West Northamptonshire Annual Status Report 2022 [online]. Available at: https://www.southnorthants.gov.uk/downloads/download/443/annual-air-quality-reports. Accessed July 2023.

No exceedances of NO_2, PM_{10} or $PM_{2.5}$ are predicted in either the opening year or design year with or without the Proposed Scheme in place. In both the opening and design year, most of the properties in the study area are predicted to experience an improvement in pollutant concentrations.

Table 1 - Concentrations at sensitive receptors in the study area (Option 1, opening year)

Pollutant		NO_2	PM_{10}	$PM_{2.5}$
Annual Mean Limit Value (µg/m^3)		40	40	20
Number of Properties Exceeding Limit Value	**DM Exceedances**	0	0	0
	DS Exceedances	0	0	0
	Removed Exceedances	0	0	0
	New Exceedances	0	0	0
Total Number of Properties	**Improvement in Concentration**	153	142	119
	No Change in Concentration	4	19	43
	Deterioration in Concentration	9	5	4
DS-DM Annual Mean Change (µg/m^3)	**Maximum Improvement**	5.7	1.5	0.9
	Maximum Worsening	1.2	0.4	0.2

Table 2 - Concentrations at sensitive receptors in the study area (Option 1, design year)

Pollutant		NO_2	PM_{10}	$PM_{2.5}$
Annual Mean Limit Value (µg/m^3)		40	40	20
Number of Properties Exceeding Limit Value	**DM Exceedances**	0	0	0
	DS Exceedances	0	0	0
	Removed Exceedances	0	0	0
	New Exceedances	0	0	0
Total Number of Properties	**Improvement in Concentration**	153	143	120
	No Change in Concentration	7	18	42
	Deterioration in Concentration	6	5	4
DS-DM Annual Mean Change (µg/m^3)	**Maximum Improvement**	3.9	1.5	0.9
	Maximum Worsening	0.7	0.4	0.2

The local air quality assessment has been undertaken and analysis indicated that there is an overall improvement in local air quality with respect to NO_2 and $PM_{2.5}$ across the study area as a result of the Proposed Scheme. **Table 3** and **Table 4** show the NO_2 and $PM_{2.5}$ assessment scores for Option 1 in the opening year, respectively.

For NO_2 a net total score of -191.76 is predicted. For $PM_{2.5}$, a net total score of -30.65 is predicted. Both of these reflect an improvement in air quality with regard to local concentrations of the respective pollutant in the opening year.

Table 3 – NO_2 summary of routes and assessment scores (Option 1, opening year)

NO_2 Summary of Routes	0-50m	50-100m	100-150m	150-200m	0-200m
Total properties across all routes (min)	70	48	28	20	166
Total properties across all routes (some)	70	48	28	20	166
Do-minimum NO_2 assessment score across all routes	624.51	354.77	195.76	134.35	1309.39
Do-something NO_2 assessment score across all routes	475.61	323.90	187.13	130.99	1117.63
Net total assessment score for NO_2, all routes					-191.76

Table 4 – $PM_{2.5}$ summary of routes and assessment scores (Option 1, opening year)

$PM_{2.5}$ Summary of Routes	0-50m	50-100m	100-150m	150-200m	0-200m
Total properties across all routes (min)	70	48	28	20	166
Total properties across all routes (some)	70	48	28	20	166
Do-minimum $PM_{2.5}$ assessment score across all routes	598.83	399.08	230.15	163.52	1391.58
Do-something $PM_{2.5}$ assessment score across all routes	574.93	394.15	228.82	163.03	1360.93
Net total assessment score for $PM_{2.5}$, all routes					-30.65

Table 5 and

Table *6* show the NO_2 and $PM_{2.5}$ assessment scores for Option 1 in the design year, respectively.

For NO_2 a net total score of -131.23 is predicted. For $PM_{2.5}$, a net total score of -30.72 is predicted. Both of these reflect an improvement in air quality with regard to local concentrations of the respective pollutant in the opening year.

Table 5 – NO_2 summary of routes and assessment scores (Option 1, design year)

NO_2 Summary of Routes	0-50m	50-100m	100-150m	150-200m	0-200m
Total properties across all routes (min)	70	48	28	20	166
Total properties across all routes (some)	70	48	28	20	166
Do-minimum NO_2 assessment score across all routes	532.39	315.91	176.63	122.64	1147.57
Do-something NO_2 assessment score across all routes	431.04	294.46	170.60	120.24	1016.34
Net total assessment score for NO_2, all routes					-131.23

Table 6 – $PM_{2.5}$ summary of routes and assessment scores (Option 1, design year)

$PM_{2.5}$ Summary of Routes	0-50m	50-100m	100-150m	150-200m	0-200m
Total properties across all routes (min)	70	48	28	20	166
Total properties across all routes (some)	70	48	28	20	166
Do-minimum $PM_{2.5}$ assessment score across all routes	595.55	396.93	228.95	162.73	1384.16
Do-something $PM_{2.5}$ assessment score across all routes	571.70	391.96	227.60	162.18	1353.44
Net total assessment score for $PM_{2.5}$, all routes					-30.72

Table 7 shows the air quality valuation derived from the assessment scores. The total value of change in air quality is monetised at £151,166, indicating a net benefit with regards to air quality. The change in localised NO_2 concentrations leads to a benefit of £55,729, approximately 37% of the total value of change in air quality. The change in localised $PM_{2.5}$ concentrations leads to a benefit of £95,437, approximately 63% of the total value of change in air quality.

Table 7 – Option 1 air quality valuation

	Change in Assessment Scores Over 60 Year Appraisal Period	Valuation (Present Value)
NO_2 Concentrations	-8,358.04	£55,729
$PM_{2.5}$ Concentrations	-1,842.64	£95,437
Total Value of Change in Air Quality		£151,166

Option 2

The local air quality assessment has been undertaken and the analysis indicates that there is an overall improvement in local ambient air quality with respect to NO_2 and $PM_{2.5}$ as a result of the Proposed Scheme. **Table 8** and **Table 9** show the concentrations and impacts of the sensitive receptors in the study area as a result of the Proposed Scheme in the opening and design years.

No exceedances of NO_2, PM_{10} or $PM_{2.5}$ are predicted in either the opening year or design year with or without the Proposed Scheme in place. In both the opening and design year, most of the properties in the study area are predicted to experience an improvement in pollutant concentrations.

Table 8 – Concentrations at sensitive receptors in the study area (Option 2, opening year)

Pollutant		NO_2	PM_{10}	$PM_{2.5}$
Annual Mean Limit Value (µg/m^3)		40	40	20
Number of Properties Exceeding Limit Value	**DM Exceedances**	0	0	0
	DS Exceedances	0	0	0
	Removed Exceedances	0	0	0
	New Exceedances	0	0	0
Total Number of Properties	**Improvement in Concentration**	153	143	120
	No Change in Concentration	3	17	42
	Deterioration in Concentration	10	6	4
DS-DM Annual Mean Change (µg/m^3)	**Maximum Improvement**	5.7	1.6	0.9
	Maximum Worsening	1.3	0.4	0.3

Table 9 – Concentrations at sensitive receptors in the study area (Option 2, design year)

Pollutant		NO_2	PM_{10}	$PM_{2.5}$
Annual Mean Limit Value (µg/m^3)		40	40	20
Number of Properties Exceeding Limit Value	**DM Exceedances**	0	0	0
	DS Exceedances	0	0	0
	Removed Exceedances	0	0	0
	New Exceedances	0	0	0
Total Number of Properties	**Improvement in Concentration**	154	143	121
	No Change in Concentration	6	18	42
	Deterioration in Concentration	6	5	3
DS-DM Annual Mean Change (µg/m^3)	**Maximum Improvement**	3.9	1.5	0.9
	Maximum Worsening	0.8	0.4	0.2

The local air quality assessment has been undertaken and analysis indicated that there is an overall improvement in local air quality with respect to NO_2 and $PM_{2.5}$ across the study area as a result of the Proposed Scheme. **Table 10** and **Table 11** show the NO_2 and $PM_{2.5}$ assessment scores for Option 2 in the opening year, respectively.

For NO_2 a net total score of -194.87 is predicted. For $PM_{2.5}$, a net total score of -31.33 is predicted. Both of these reflect an improvement in air quality with regard to local concentrations of the respective pollutant in the opening year.

Table 10 – NO_2 summary of routes and assessment scores (Option 2, opening year)

NO_2 Summary of Routes	0-50m	50-100m	100-150m	150-200m	0-200m
Total properties across all routes (min)	70	48	28	20	166
Total properties across all routes (some)	70	48	28	20	166
Do-minimum NO_2 assessment score across all routes	624.51	354.77	195.76	134.35	1309.39
Do-something NO_2 assessment score across all routes	474.30	322.88	186.57	130.77	1114.52
Net total assessment score for NO_2, all routes					-194.87

Table 11 – $PM_{2.5}$ summary of routes and assessment scores (Option 2, opening year)

$PM_{2.5}$ Summary of Routes	0-50m	50-100m	100-150m	150-200m	0-200m
Total properties across all routes (min)	70	48	28	20	166
Total properties across all routes (some)	70	48	28	20	166
Do-minimum $PM_{2.5}$ assessment score across all routes	598.83	399.08	230.15	163.52	1391.58
Do-something $PM_{2.5}$ assessment score across all routes	574.63	393.97	228.70	162.95	1360.25
Net total assessment score for $PM_{2.5}$, all routes					-31.33

Table 12 and **Table 13** show the NO_2 and $PM_{2.5}$ assessment scores for Option 2 in the design year, respectively.

For NO_2 a net total score of -133.45 is predicted. For $PM_{2.5}$, a net total score of -31.37 is predicted. Both of these reflect an improvement in air quality with regard to local concentrations of the respective pollutant in the opening year.

Table 12 – NO_2 summary of routes and assessment scores (Option 2, design year)

NO_2 Summary of Routes	0-50m	50-100m	100-150m	150-200m	0-200m
Total properties across all routes (min)	70	48	28	20	166
Total properties across all routes (some)	70	48	28	20	166
Do-minimum NO_2 assessment score across all routes	532.39	315.91	176.63	122.64	1147.57
Do-something NO_2 assessment score across all routes	430.03	293.81	170.18	120.10	1014.12
Net total assessment score for NO_2, all routes					-133.45

Table 13 – $PM_{2.5}$ summary of routes and assessment scores (Option 2, design year)

$PM_{2.5}$ Summary of Routes	0-50m	50-100m	100-150m	150-200m	0-200m
Total properties across all routes (min)	70	48	28	20	166
Total properties across all routes (some)	70	48	28	20	166
Do-minimum $PM_{2.5}$ assessment score across all routes	595.55	396.93	228.95	162.73	1384.16
Do-something $PM_{2.5}$ assessment score across all routes	571.39	391.78	227.47	162.15	1352.79
Net total assessment score for $PM_{2.5}$, all routes					-31.37

Table 14 shows the air quality valuation derived from the assessment scores. The total value of change in air quality is monetised at £154,136, indicating a net benefit with regards to air quality. The change in localised NO_2 concentrations leads to a benefit of £56,662, approximately 37% of the total value of change in air quality. The change in localised $PM_{2.5}$ concentrations leads to a benefit of £97,474, approximately 63% of the total value of change in air quality.

Table 14 – Option 2 air quality valuation

	Change in Assessment Scores Over 60 Year Appraisal Period	Valuation (Present Value)
NO_2 Concentrations	-8,498.36	£56,662
$PM_{2.5}$ Concentrations	-1,881.88	£97,474
Total Value of Change in Air Quality		£154,136

SUMMARY

Table 15 compares the assessment scores and values of change in air quality for both options. Option 1 has a total value of change in air quality of £151,166. Option 2 has a slightly higher total value of change in air quality of £154,136. This is an increase in value of £2,970 more than Option 1, which represents an approximate 2% increase in value.

Table 15 – Comparison of Options

	Option 1	Option 2
NO_2 Concentrations Assessment Score Change Over 60 Year Appraisal Period	-8,358.04	-8,498.36
NO_2 Concentrations Valuation (Present Value)	£55,729	£56,662
$PM_{2.5}$ Concentrations Assessment Score Change Over 60 Year Appraisal Period	-1,842.64	-1,881.88
$PM_{2.5}$ Concentrations Valuation (Present Value)	£95,437	£97,474
Total Value of Change in Air Quality	£151,166	£154,136

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