Tuxford Bypass Summary Report DR-12730

Technical Note

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Quality information

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1 Introduction

Overview

1.1.1 AECOM has been commissioned by Locality to undertake a review of a single route option for a potential bypass around Tuxford. This high-level review includes a review of the study area, accident data, topography, land use, flood risk, and high-level heritage and environmental constraints, along with design principles behind the design. Recommendations for the next steps of the route development are also provided.

1.1.2 Tuxford is a historic market town, sitting astride the A1 dual carriageway in the District of Bassetlaw in Nottinghamshire. The A1 passes through the centre of Tuxford and divides Tuxford into an East and West section. The town boasts a rich cultural heritage both for the markets and the historic buildings located within the area, St Nicholas' Church, and the Tuxford Library, for example.

1.1.3 The route is being developed for Tuxford Town Council to attempt to find a solution to the large number of HGVs that pass through the town, which currently create an unsafe and unattractive environment for the town of Tuxford. While the large number of HGVs raise issues at the local level, they are necessary for local employment at the local industrial estates. The aim is to find a way for the route to enable the HGV traffic flow to continue to their destinations while also addressing the community's concerns.

1.1.4 This report will summarise the findings of a desk-based assessment of the existing site constraints and will develop a minimum of one route for a bypass. High level estimates of the anticipated construction costs are also provided.

Study Objectives

1.1.5 The main objective of this study is to investigate the location for a northern bypass and to produce initial concept designs for feasibility. The route should aim to remove as much HGV traffic as possible through the Town.

1.1.6 Proposal for the route should be developed in accordance with key design guidance including the DMRB's Highway guidance and, where applicable, the Department for Transport's (DfT) Local Transport Note (LTN) 1/20. Considerations will be made for the delivery of a feasible route and the impact on heritage and ecology, as well as cost and deliverability.

1.1.7 A preferred route is identified following an assessment of potential route options. Recommendations for next steps for Tuxford Town Council to implement are also provided.

2 Study Area

Site Information / Existing Road Network

2.1.1 Tuxford is a historic market town in Newark, Nottingham. The town is intersected through the middle by the A1, separating the East side of Tuxford from the West as shown in Figure 1. The red box in the figure indicates where the proposed Northern route of the bypass will be located.

2.1.2 A number of other small towns are located in the immediate area around Tuxford, East Markham to the north, West Markham and Markham Moor to the north-west.

2.1.3 The A1 runs from the North/South through the middle of the Tuxford and continues in both directions, North towards the Markham Moor Interchange, and South towards Newark-on-Trent. Other key roads located in the area of Tuxford are the A6075 from the East/West, Egmanton Road from the South, the B1164 from the North/South, Tuxford Road to the North, and Bevercotes Lane from the East/West.

Figure 1. Area of Study – Bing Maps

Road Safety

2.1.4 Road safety collision statistics have been obtained from the DfT (via the Crashmap database) from 01/01/2017 to 31/12/2022, noted below in Figure 2. It is normal to review the most recent five years of collisions; however, given lockdowns in 2020 a further year of collisions has been reviewed for this analysis.

2.1.5 The data obtained relates to those collisions that resulted in a personal injury and which were reported to the police. This data (known as STATS19 statistics) is generally recognised to be the most complete record of road collisions occurring on the local highway network. For the avoidance of doubt, and as is normal practice, they do not include statistics from collisions resulting in "damage-only" to vehicles, or which were not reported to the police.

2.1.6 Each collision resulting in a personal injury is classed as either 'Slight', 'Serious' or 'Fatal' by the police depending on the most serious injury resulting from the collision (i.e. a collision resulting in two 'Slight' injuries and one 'Serious' injury would be classified as a 'Serious' collision). Definitions given in Road Accidents Great Britain (published by the DfT) are as follows:

- Slight: An injury of a minor character such as a sprain (including neck whiplash injury), bruise or cut which are not judged to be severe, or slight shock requiring roadside attention. This definition includes injuries not requiring medical treatment.
- Serious: An injury for which a person is detained in hospital as an "in-patient", or any of the following injuries whether or not they are detained in hospital: fractures, concussion, internal injuries, crushings, burns (excluding friction burns), severe cuts, severe general shock requiring medical treatment and injuries causing death 30 or more days after the accident. An injured casualty is recorded as seriously or slightly injured by the police on the basis of information available within a short time of the accident. This generally will not reflect the results of a medical examination but may be influenced according to whether the casualty is hospitalised or not. Hospitalisation procedures will vary regionally.
- Fatal: Human casualties who sustained injuries which caused death less than 30 days (before 1954, about two months) after the accident. Confirmed suicides are excluded.

2.1.7 The data shows that:

- There are no clusters of collisions within Tuxford;
- Two collisions involved goods vehicles, both classed as 'slight' by the police. These did not occur in the same location.
- Three collisions involved pedestrians, two of which were classed as 'slight' by the police and one of which was classed as 'serious'. These did not occur in the same location, and the collision classed as 'serious' occurred on Gilbert Avenue (a thoroughfare which would not be impacted by the bypass).
- One pedal cycle-involved collision occurred at the junction of Ollerton Road and Eldon Street which was classed as 'slight' by the police.

2.1.8 The collision record within the town does not appear to warrant mitigation at the current time. Notwithstanding this, reducing industrial HGV traffic through Tuxford via a bypass gives opportunities for junction improvements that would improve safety:

- Fewer HGVs mean reduced risk of collisions at the Ollerton Road and Eldon Street junction. Large vehicles have limited visibility and longer stopping distances, which can pose dangers to pedestrians and cyclists. With fewer HGVs, pedestrians and cyclists can cross the junction more safely, especially during peak hours.

- Space Reallocation: By minimizing HGV traffic, there's more space available for other road users. This allows for wider pedestrian crossings, dedicated cycle lanes, and improved junction layouts. Reallocation of road space can prioritize safety and convenience for vulnerable road users.

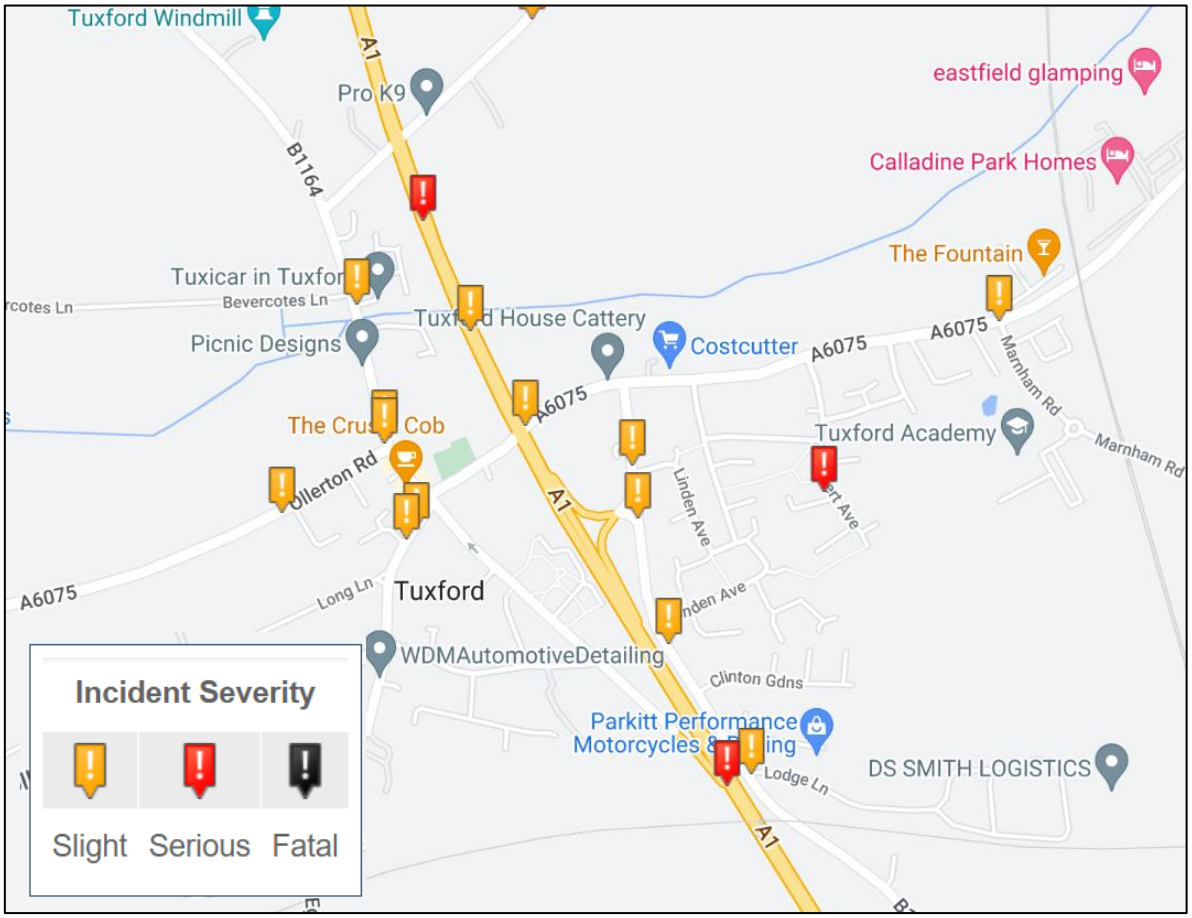

Figure 2. Location of Collisions – CrashMap

3 Topography

3.1.1 The information from OpenRoads ConceptStation shows the topography of the proposed route throughout its course at an exaggerated vertical scale for clarity. Traversing from left to right, this profile follows the course from North to South. The route shown in Figure 4 provides perspective to help analyse the vertical alignment.

3.1.2 From North to South, the bypass begins at a new roundabout at the B1164. At this point the carriageway is at a level of approximately 72m above ordinance datum (AOD) and descends on a down gradient for approximately 980m at 5.8%. The lowest level of the route is around 47.2m AOD. An upward gradient then begins and continues for approximately 198m, with a 6% steepest gradient before softening to end at a roundabout at the A6075 at a level of 55.2m AOD.

3.1.3 The design guidance for vertical alignments from CD 109 were followed and resulted in appropriate gradients as well as adequate K-values for crests and sags in the profile of the bypass.

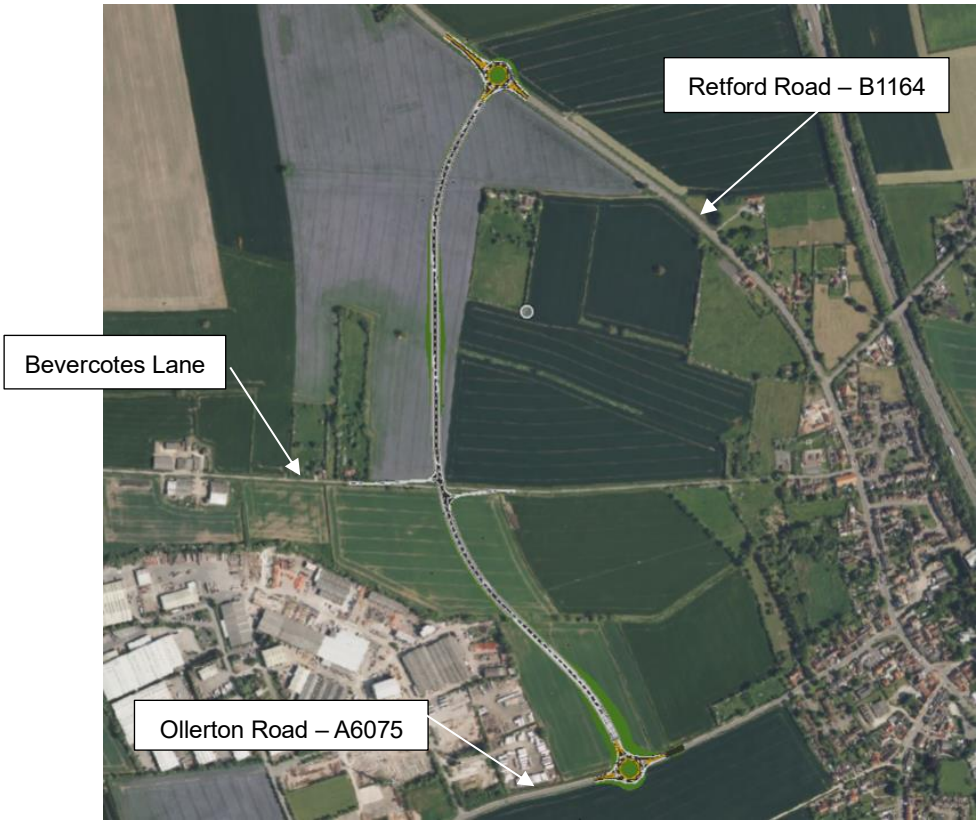

Figure 3. Horizontal Alignment of the Proposed Bypass - OpenRoads ConceptStation

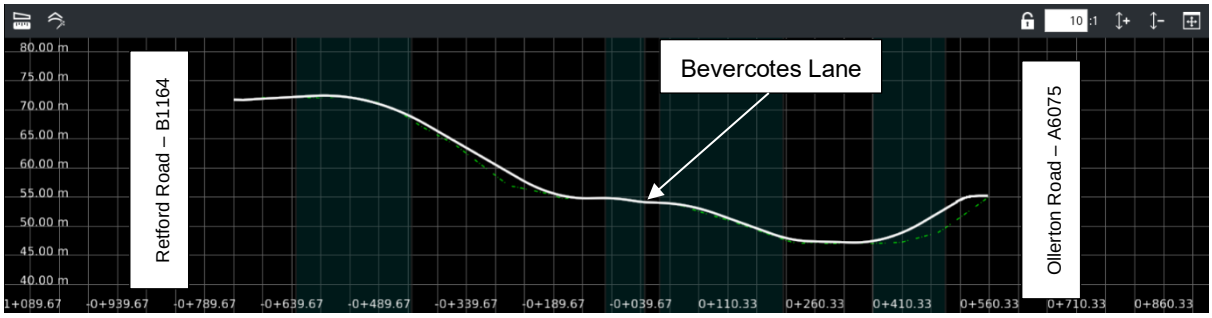

Figure 4. Topographical Information of the Proposed Bypass - OpenRoads ConceptStation

4 Land Use

4.1.1 Tuxford has three main industrial estates/business parks exhibited in Figure 5. The estates are located either side of the town centre, Walkers (west), Lodge Lane (southeast) and Tuxford Business Park (southeast). There are also another significant freight/logistics centre that generate high volumes of east-west HGV traffic between through Tuxford called Boughton Industrial Estate which is located to the west of Tuxford towards Ollerton on the A6075. These are some of the main contributors to high volumes of HGV traffic, which impacts the residents negatively. The volume of HGVs can be mitigated via the use of weight restrictions in the town centre and the proposed bypass which will help divert HGVs away from Tuxford town centre. The HGVs would be diverted to the Markham Moor Interchange which is shown in Figure 1.

4.1.2 The land use surrounding Walkers Industrial Estate has been assessed and can be found in Figure 6. This data is imperative to the feasibility of the bypass as the land will need to be acquired to facilitate the bypass. According to the National Historic Landscape Characterisation, the land east of Walkers Industrial Estate is enclosed agriculture, and the land north of Walkers Industrial Estate is unimproved land.

4.1.3 Most of the land impacted around Walkers Industrial Estate bypass is privately owned and landowners will need to be consulted regarding the project. The relevant INSPIRE Index Polygons were found and the unique identification numbers (Land Registry Inspire IDs) were recorded. With these Land Registry Inspire IDs, the land can be related to a registered title. The information in both Table 1 and Table 2 can be used to find the land registry information of the land on and around the proposed site. Once the owners are found, a consultation can be conducted regarding the impact on their land the project would cause. The IDs in Table 1 are the most significant as these will have the bypass directly impacting the land they correspond to.

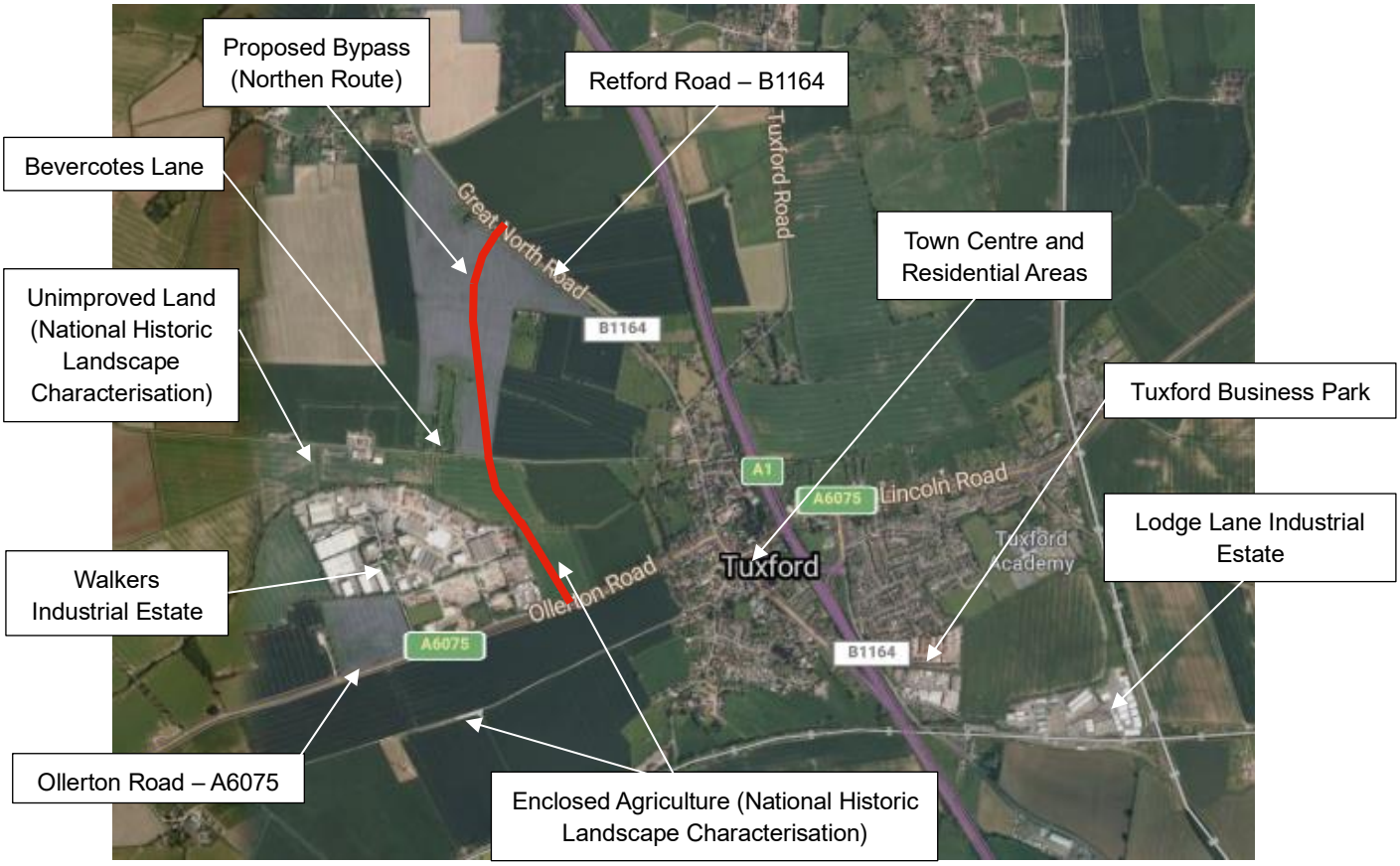

Figure 5. Satellite Image of Tuxford, 2023, Bing Maps

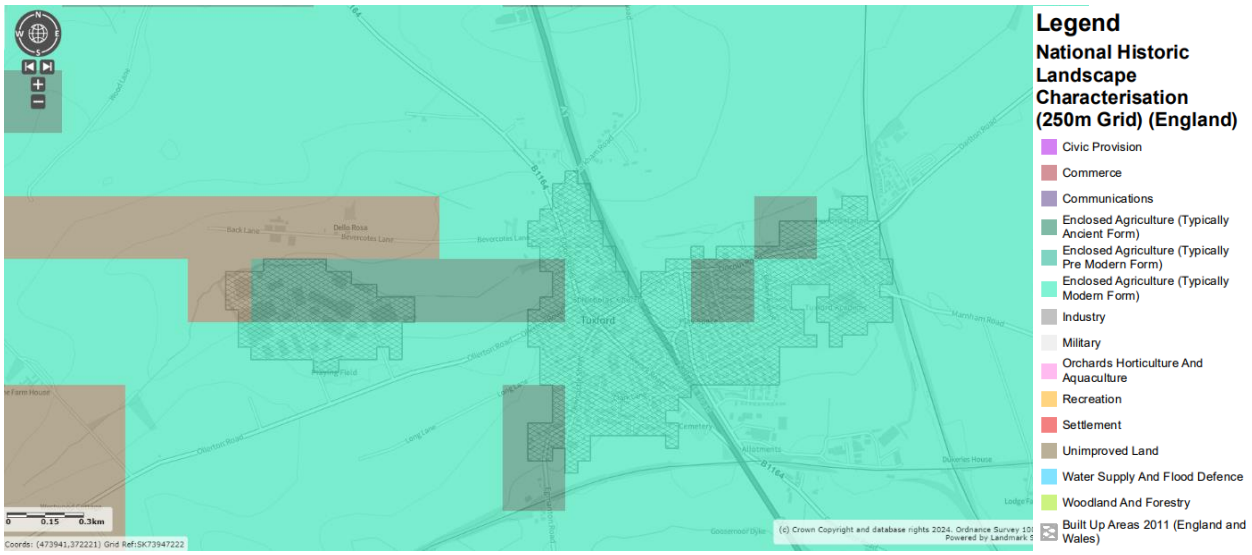

Figure 6. Landscape Characterisation of Tuxford, Defra Magic Map

Table 1. Land Registry Inspire ID of Land Directly Impacted by the Northern Route

Description of Location	Land Registry Inspire ID
Land North of Ollerton Road	45648186, 45652388
Land South of Bevercotes Lane	30718590, 52883683, 45648186
Land North of Bevercotes Lane	52883683
Land South-West of Retford Road	30741689, 30727465, 52883683
Land North-East of Retford Road	30727479, 40954990

Table 2. Land Registry Inspire ID of Land Indirectly Impacted by the Northern Route

Description of Location	Land Registry Inspire ID
East Section of Walkers Industrial Estate	30716953, 60136741, 52883683, 57430709
Land South of Bevercotes Lane	30744286
Land North of Bevercotes Lane	30727396, 30729352, 44036181, 30711099, 30711262
Property South-West of Retford Road	30725853
Land South-West of Retford Road	59712375, 30734728, 30718650, 30715976, 30687226
Land North-East of Retford Road	30743368

5 Public Rights of Way

5.1.1 Two Public Rights of Way (PRoW) run close to the site. The two relevant PRoWs are a bridleway named Tuxford BW12 and a footpath named Tuxford FP4. These two PRoWs are shown in Figure 7.

5.1.2 It is anticipated that there will be no significant impact on existing PRoWs with the Northern bypass.

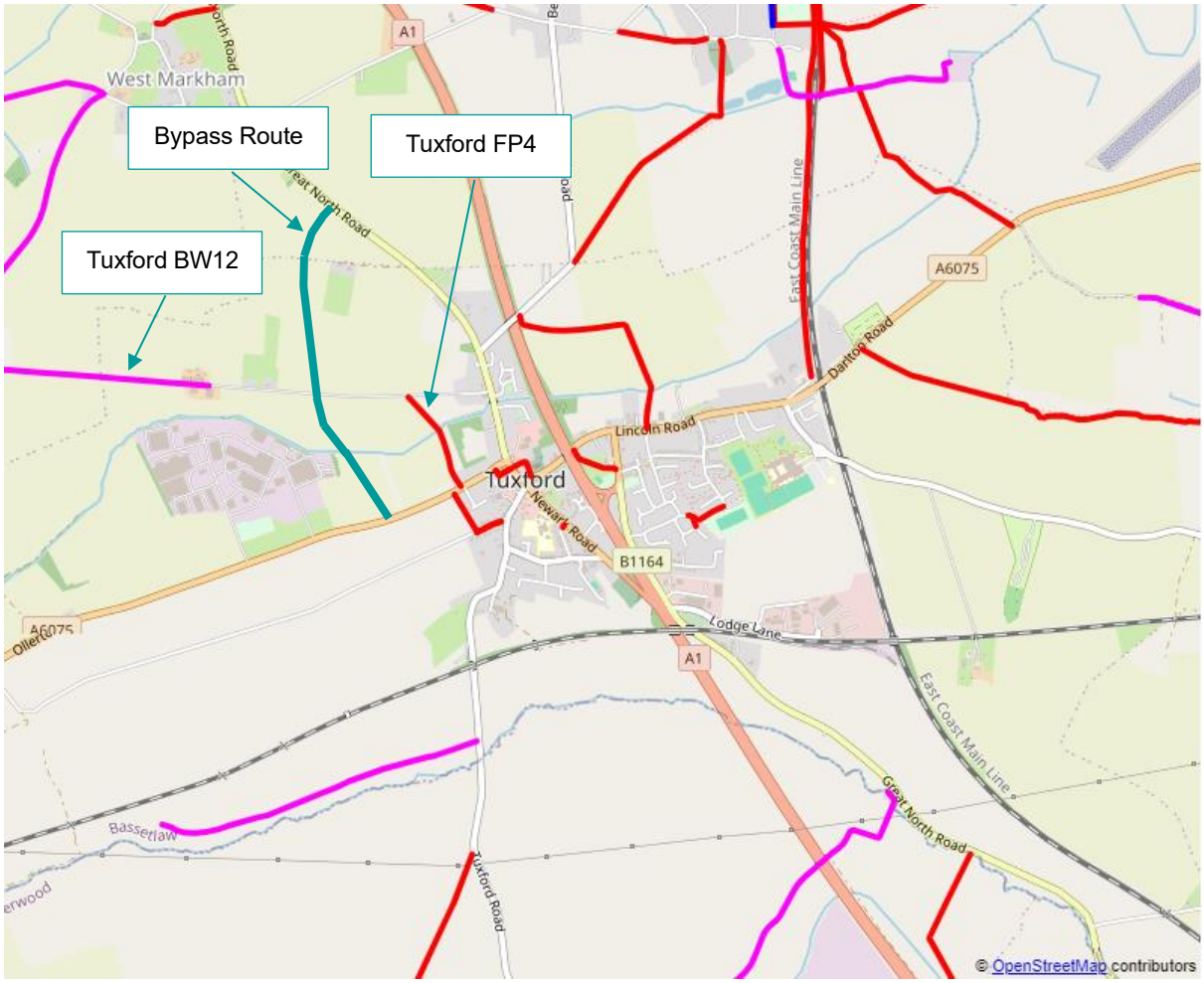

Figure 7. Public Rights of Way in/near Tuxford, OpenStreet Map with Nottinghamshire County Council Data

6 Flood Risk Overview

6.1.1 Using information from the Environment Agency a flood map of Tuxford was produced, found in Figure 8. This map shows areas with the highest probability of flooding, which are commonly areas in close proximities to bodies of water. Flood zone 3 is present in Tuxford and is known as land which has a 1% or greater annual probability of river flooding. This impacts residential areas as well as agricultural land in Tuxford but does not in the proposed area for the bypass.

6.1.2 The land that is impacted by the northern bypass is located within flood zone 1. Land within flood zone 1 has a low probability of flooding from rivers and the sea.

6.1.3 The source of the flood risk in Tuxford is a small river, a tributary of the river Trent, which passes through Tuxford town centre as well as the proposed site for the bypass shown in Figure 9. As a result of the river passing thought the site there could be some flood risk associated. However, the data from the Environment Agency specified that over the whole area of the proposed site it was all within flood zone 1. This means it has a low probability of flooding from rivers and is the lowest risk flood zone compared to zone 2 and 3. Further surveys would be required to get a more accurate comprehension of the flood risk on the proposed site especially data from the river.

6.1.4 Consequently, a culvert would be required to channel water underneath the bypass, which would require caution and consideration during the construction. Any new drainage systems proposed in addition to the bypass should be thoroughly assessed along with existing drainage systems. A detailed STATs survey should be carried out to enable the new drainage systems to connect to the existing ones, and a detailed flood risk survey would help to produce any mitigatory infrastructure needed. If suitable, sustainable urban drainage systems (SuDS) could be implemented to mitigate the increased runoff the bypass would cause, thus mitigating an increased chance of flooding to the surrounding fields and properties.

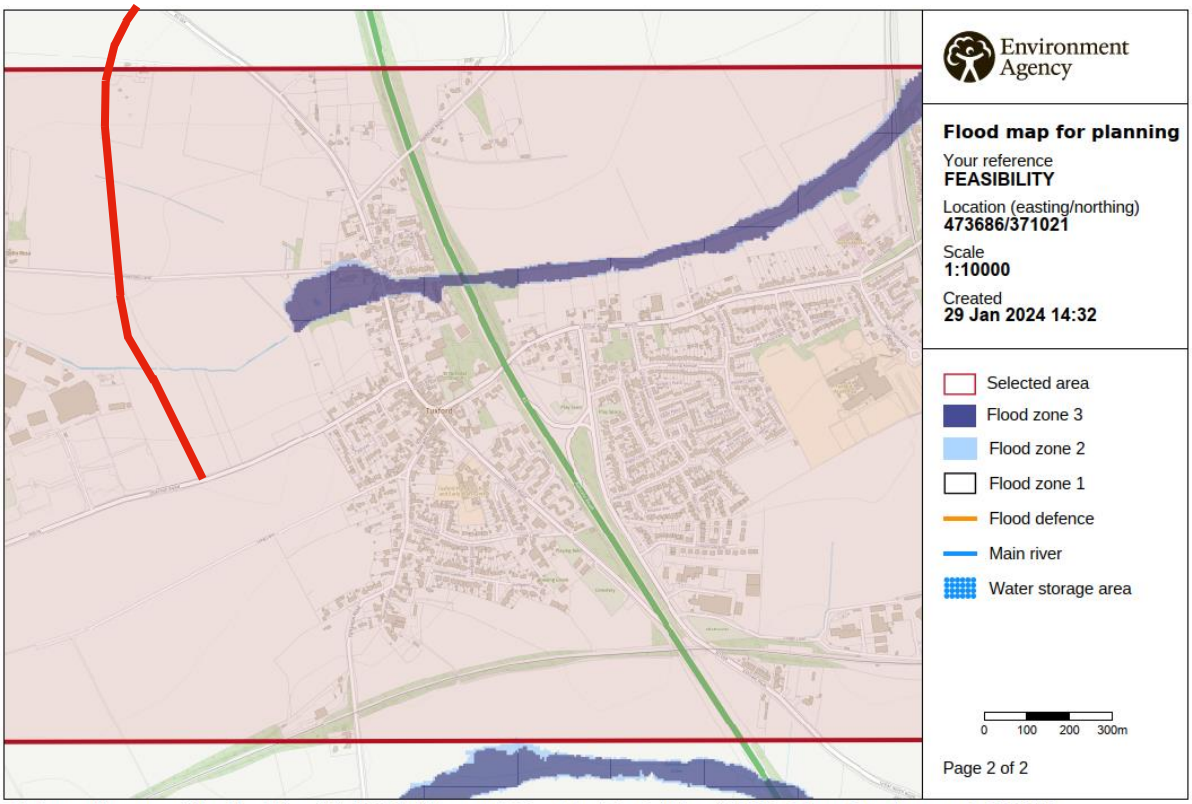

Figure 8. Tuxford Flood Map for Planning - Environment Agency

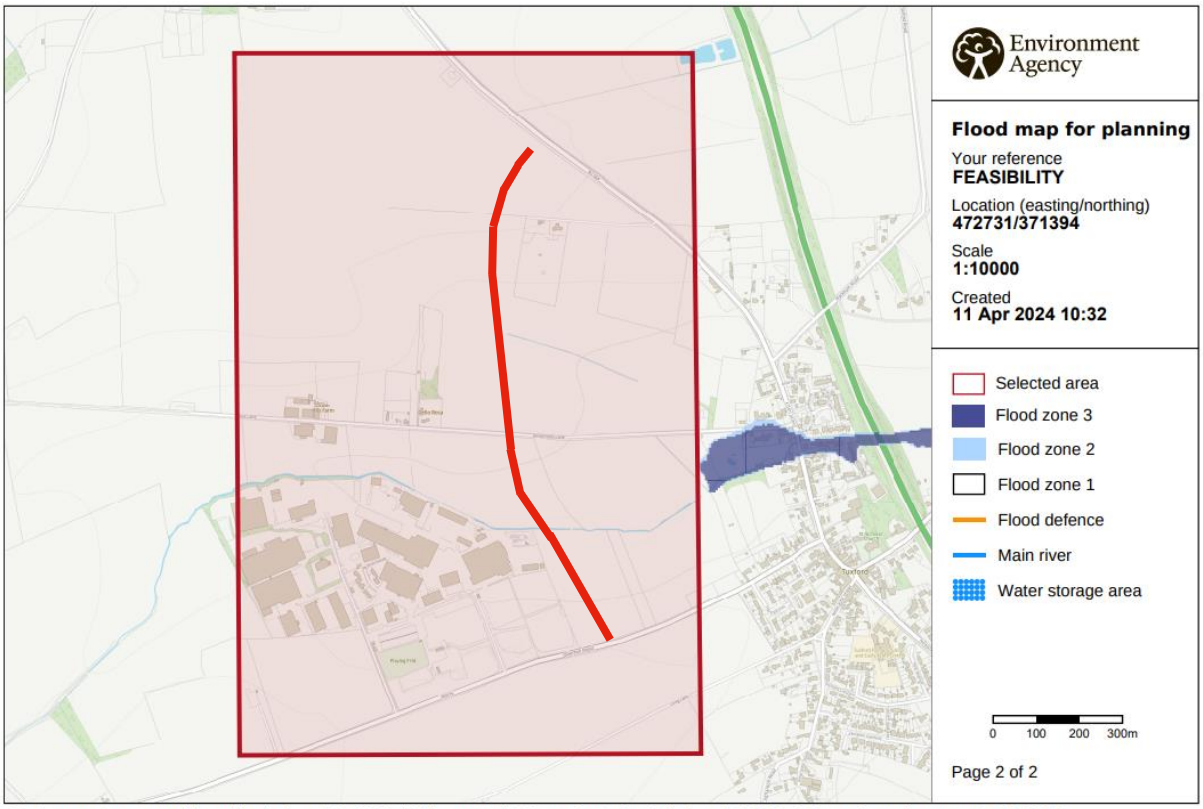

Figure 9. Proposed Northern Route Flood Map for Planning - Environment Agency

7 Desk Based Review of Heritage and Environmental Constraints

7.1.1 The observed areas of interest surrounding the proposed Northern Route include listed buildings, scheduled monuments, Countryside and Rights of Way Act 2000 along with Registered Common Land. These areas should be taken into consideration at all stages of the project to avoid oversights and faults, which in turn could become constraints that strain timescales and budgets. Many of the observed areas of interest lie outside of the 500m buffer which means construction would have a relatively low impact on the areas of interest.

7.1.2 There were many environmental areas of interest for which the northern bypass would not have no significant impact, such as nature reserves, special areas of conservation and ancient woodland. All areas of interest can be found in the legend of Figure 10.

7.1.3 Further ecology surveys would be required to determine impacts on protected species.

7.1.4 The main sources of noise pollution are from the A1, with two Noise Important Areas (NIAs) in Tuxford represented in Figure 11. An NIA highlights “hotspot” locations where the highest 1% of noise levels at residential locations can be found. In accordance with the noise actions plans, the NIAs provide a framework for further investigation. The bypass would become a source of noise pollution; however, it is anticipated that there would be minimal negative impact to the residents in and around the town centre. The Northern Route would be sited further from residential properties which means the noise impact will be minimal.

7.1.5 The proposed bypass would be beneficial to the local community due to the reduced number of HGVs in the town centre therefore better air quality and less noise pollution to residents. However, the additional carbon emissions this project would cause should be considered. The weight limits that are to be implemented in conjunction with the bypass mean that HGVs would have to travel to Markham Moor Interchange more often. This results in an increase of emissions due to the greater distances that the HGVs must travel to reach the industrial estates and business parks generally increasing, offset to an unknown extent by the reduction of travel times through the centre of Tuxford.

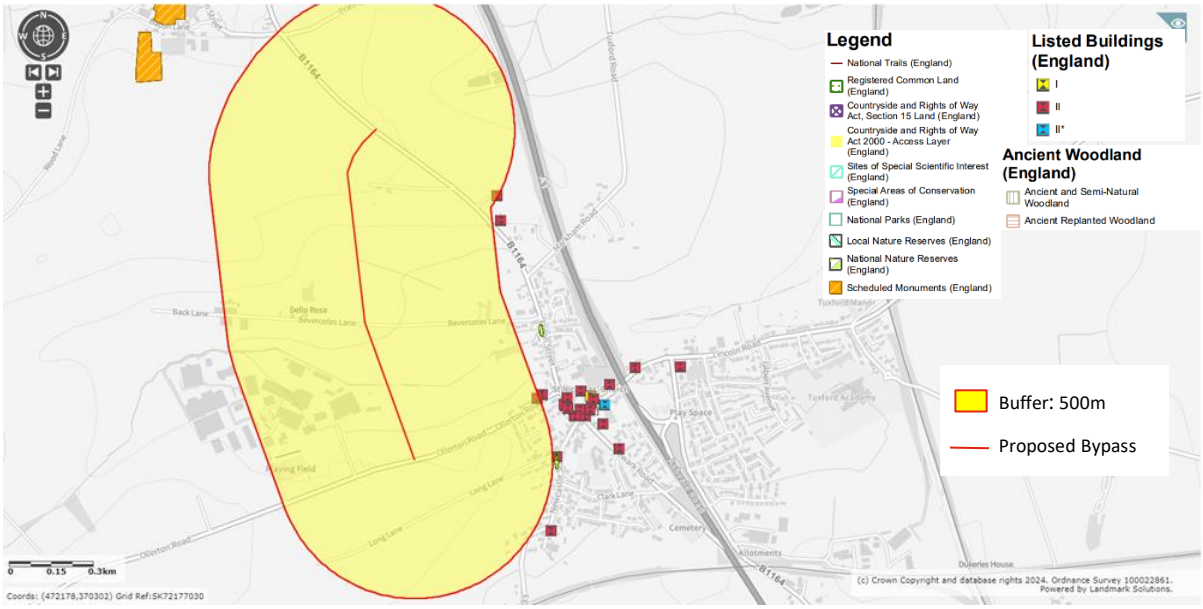

Figure 10. Areas of interest surrounding the proposed Tuxford bypass - Defra Magic Map

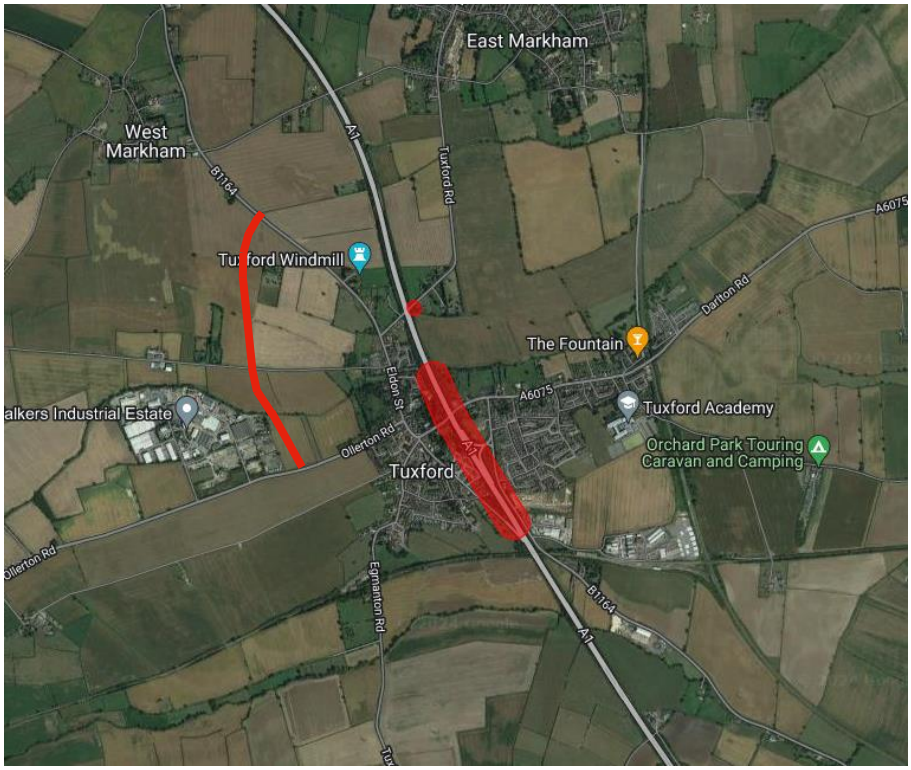

Figure 11. Current Noise Pollution Map of Tuxford Caused by Traffic – Crystal Roof

8 Route Development

Design Guidance

8.1.1 Design Manual for Roads and Bridges (DMRB) CD 109 Highway Link Design
CD 109 was last issued by DMRB in March 2020 and provides guidance for the design of highway link roads. Key points noted within CD 109 are as follows:

- Design Speed
- Vertical Alignment
- Horizontal Alignment

8.1.2 CD 109 provides guidance for roads by providing the required values, and one step below desirable values for: stopping sight distance, horizontal curvature, vertical curvature, and overtaking sight distances. This also offers guidance on the selection of design speed for rural and urban roads, minimum and maximum gradients, crest and sag curves, road camber and superelevation, transitions, and any acceptable relaxations.

8.1.3 **Junction Designs and other considerations:** The following DMRB documents provide guidance for the design of junctions and other considerations:

- DMRB CD 116 Geometric design of roundabouts
- DMRB CD 123 Geometric design of at-grade priority and signal-controlled junctions
- DMRB CD 127 Cross-sections and headrooms
- DMRB CD 143 Designing for walking, cycling and horse-riding
- DMRB CD 195 Designing for cycle traffic

8.1.4 Local Transport Note (LTN) 1/20
LTN 1/20 was released by the Department for Transport in July 2020 and provides guidance and good practice for the design of cycle infrastructure. In respect of funding for new schemes the foreword of LTN 1/20 communicates the following key points:

- Proposed schemes will be reviewed by Active Travel England against the summary principles of LTN 1/20 before funding is agreed.
- Constructed schemes will be checked and the Department for Transport reserves the right to ask for funding to be returned if the scheme is not built in accordance with LTN 1/20.
- To obtain government funding for local highway schemes it is assumed that cycling facilities will be brought up to the standards of LTN 1/20 unless it is clear that cycling provision is not required for that particular scheme.

8.1.5 LTN 1/20 provides mechanisms for assessing a scheme in terms of quality and safety through the Cycling Level of Service (CLoS) and Junction Assessment Tool (JAT). LTN 1/20 states that to be considered for funding, the CLoS needs to be at least 70% with no critical fails and that there must be no red scored turning movements as assessed by the JAT. Active Travel England is in the process of producing more detailed guidance for scheme promotors to demonstrate compliance with LTN 1/20 as well as defining its role in providing advice assessing scheme quality.

Proposed Northern Bypass

8.1.6 The broad location of a Northern Bypass Route was proposed by Tuxford Town Council. The route was designed to follow a similar path that was shown in the report written by Tuxford Town Council analysing the reduction of HGV traffic via the use of a bypass. The route follows roughly the existing

topography described in Section 4 with minimal cut/fill volumes. The total length of the Northern Bypass would be approximately 1.25km (0.79mi).

Figure 12. Proposed Northern Route - OpenRoads ConceptStation

Design Considerations for Northern Bypass

8.1.7 A key consideration of the designed route was to pass through a minimal amount of INSPIRE Index Polygons as possible, which define property and land boundaries. It provides a route which has adequate radii and attempts to have as little negative impact to the surrounding area by trying to be as distant from residential properties as possible. Table 3.1 shows INSPIRE Index Polygons surrounding the proposed site which should be consulted on the proposition due to direct/indirect on their property.

8.1.8 Within the Technical Note Shown in Appendix A, the Northern Route has been taken forward and varying scenarios have been produced. Scenario 1 being that the new road is the only change, and Scenario 2 is that there will be a new road along with a weight limit restriction on Eldon Street which aims to redirect HGVs.

8.1.9 According to the traffic surveys of baseline (existing) traffic movements Scenario 1 provides 47% and 29% reductions in HGV traffic on Eldon Street and Ollerton Road respectively when the new bypass is 100% utilised. The same parameters show that the reduction in all vehicles being 20% and 23% on Eldon Street and Ollerton Road respectively. All data represented was collected over 12 hours (0700-1900) analysing 2-way flows. This would provide a positive change to the town with less traffic especially HGVs which the local people of Tuxford would like to reduce.

8.1.10 The same parameters show that Scenario 2 provides 100% reductions in HGV traffic on Eldon Street and Ollerton Road (West). The reductions in HGV traffic were 53%, 2% and 27% for Lincoln Road (East), Newark Road (South) and Newcastle Street (West). The overall traffic would reduce by 26%, 11%, 36% for Eldon A6075/B1164, being Eldon Street (North), Eldon Street (South), Ollerton Road (West) retrospectively and Lincoln Road (East) respectively. The difference on the section of Eldon Street (North) when classified as the B1164 is a 26% reduction. The reductions to Newark Road

(South) and Newcastle Street (West) are minimal both being a -1% change or lower, but volumes are insignificant. All data represented was collected over 12 hours (0700-1900) analysing 2-way flows. This scenario would have a much larger impact and reroute a substantial portion of HGVs that would previously pass through Tuxford.

8.1.11 Both Scenarios would positively impact the centre of Tuxford in terms of a reduction in noise pollution, the potential for less traffic build-ups as well as an opportunity to make Tuxford safer for pedestrians and cyclists. Further analysis would be required using a dynamic reassignment model to understand the wider impacts of scenario 2.

High-Level Southern Bypass Feasibility

8.1.12 A Southern Bypass Route is indicatively shown in Figure 13. From East to West, the route begins at the exit of the A1 which joins a junction (form to be determined) then passes in between the South-Westerly residential area of Tuxford and the business A1 Steel Buildings. This passes through Egmanton Road which would be diverted to create staggered junctions that join the bypass, visibility and warnings are critical in this location. The proposed route then crosses agricultural land until meeting Ollerton Road which it joins via a roundabout.

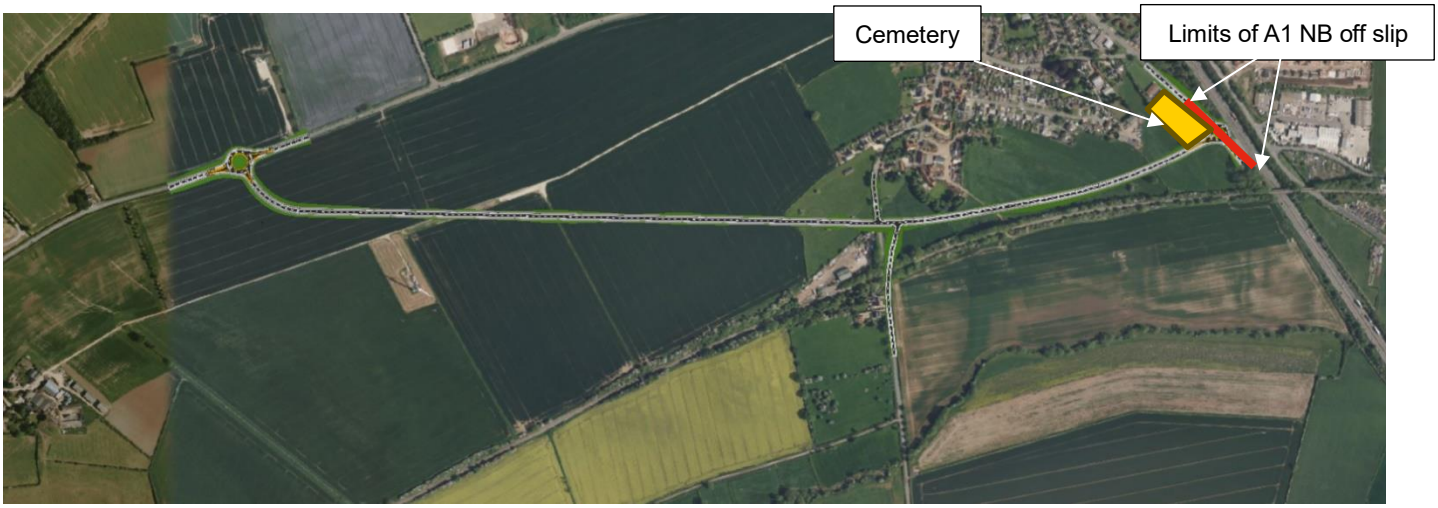

Figure 13. Proposed Potential Southern Bypass Route - OpenRoads ConceptStation

8.1.13 It should be noted that there are several reasons why a Southern Bypass has been deemed not feasible.

Complexity and Safety Concerns

8.1.14 A Southern Bypass would be much more complex due to the impact on the A1 off slip in the northbound direction. This off slip turns into Newark Road and changes quickly to a 30mph speed limit. Locating a junction within close proximity to this speed change would pose a major safety issue.

Lack of suitable junction location

8.1.15 There is no suitable location to site a junction to take the Southern Bypass.

8.1.16 To the west of the off slip / Newark Road, where the off slip ends, there is a cemetery.

8.1.17 Siting the junction within the limits of the off slip would not be acceptable to National Highways. Therefore, a junction would need to be sited within the cemetery, and the bypass travelling across it. For this reason alone, it would not be feasible to take forward a Southern Bypass.

Cost Considerations

8.1.18 Relocating the off slip further south to accommodate a suitable location of the junction would add considerable costs. This would require the rail bridge over the A1 just south of Tuxford to be reconstructed to allow for more space to fit the new off slip, adding significant costs.

8.1.19 A Southern Bypass would be approximately 1.90km (1.18mi), about 50% longer than the Northern Bypass, which would increase the cost of the scheme.

Impact on Business and Houses

8.1.20 A Southern Bypass would have a much larger impact to business and houses within close proximity to the bypass. Properties located close to the bypass route might experience decreased property values due to noise and visual impact.

8.1.21 Noise pollution from increased traffic on the new bypass route could negatively affect residents' quality of life.

Flood Risk

8.1.22 A Southern Bypass would not be located within a flood risk area.

9 Anticipated Construction Costs

9.1.1 As part of the study, high level construction costs were calculated for the Northern Route as detailed in the figure below. the cost estimate includes land purchase and construction costs using SPONS 2024, with 2024 Q1 as the cost basis. More detailed costing breakdown can be found in Appendix B.

9.1.2 The land costs were derived using the MHCLG's Land Value Estimates for Policy Appraisal figures. The values are based on 2019 values for Agricultural/Greenfield Land in Derby, Derbyshire, Nottingham and Nottinghamshire (£21,750 / ha), inflated to 2024 using Consumer Price Indices from Jan 2019 to Mar 2024 (23.7% increase), giving an adjusted rate per hectare of £26,901.

Table 3. Estimated Costs

	Cost	Notes
Preparation	£1,201,536	Calculated as 10% of Construction Costs
Construction Cost	£12,015,363	Includes 10% construction risk (contingency) Includes 46% investment cost optimism bias
Supervision Costs	£600,768	Calculated as 5% of Construction Costs
Land Costs	£2,600,967	See 9.1.2 and 9.1.3
Agent Fees	£500,000	Estimate based on project size and land required
Total	**£16,918,634**	

10 Conclusion / Way Forward

10.1.1 Upon comprehensive analysis of the feasibility of both the Northern and Southern routes, the Northern Route has been selected. This decision is predicated on the multitude of benefits that this route offers, coupled with the significantly reduced impact its construction would impose on the town. A southern bypass would not be a feasible alternative due to the complexity, safety concerns, lack of suitable junction location, prohibitive costs, and impacts to existing businesses and residential properties.

10.1.2 The Technical Note (Found in Appendix A) also stated possibility of unlocking 19 hectares (190,000m^2) of potential development land. It is assumed that the development land would be allocated for employment purposes (B2 & B8), and access to the site would be via the proposed new road. The other assumption being a development footprint area of 40% has been applied, resulting in a developable area of 7.6 hectares (76,000 sqm). The remainder of the site being roads, landscaping and other necessary infrastructure.

10.1.3 This report delineates a representation of how the Northern Route would integrate with the existing infrastructure, and it identifies potential challenges, such as modifications to current land use, that require mitigation. However, the information currently at our disposal is not exhaustive. It is imperative to undertake more detailed surveys concerning the land parcels that would be impacted by the route. The subsequent logical steps to advance the project include initiating communication with the affected landowners, and establishing collaboration with local and strategic highway authorities, as well as the local planning authority.

10.1.4 The implications of the new bypass for the centre of Tuxford would include reducing all traffic (especially HGVs), a reduction in noise pollution, and an opportunity to make Tuxford safer for pedestrians and cyclists. This is the case for either of the scenarios shown in the Technical Note, with Scenario 2 resulting in a significant reduction in HGV traffic. The Technical Note suggested that the new road could help create more efficient road network that could allow faster journey times. Scenario 1, construction of the new road only, leads to the reduction in traffic at the A6075 / B1164 junction. There are no more reductions expected in other areas of the town as a result of Scenario 1. The introduction of Scenario 2 could provide further reductions in traffic across the town owing to the reassignment of 100% of HGVs in some areas, due to the weight limit on Eldon Street. Further analysis using a dynamic reassignment model to understand the wider impacts of this reassignment is required.

10.1.5 Further work to understand the environmental impact of the bypass must be undertaken to produce an Environmental Statement. This includes a suite of assessments may include:

- Air quality and dust
- Archaeology and cultural heritage
- Landscape and visual assessment
- Ecology and biodiversity
- Geology and soils
- Materials and waste
- Noise and vibration
- Population and health
- Transport and access
- Flood risk and hydrology
- Road drainage and water environment
- Highways
- Climate change and adaptation
- Cumulative effects

10.1.6 Alongside the environmental impact assessment work, the work to prepare the strategic outline business case to an identified funding body should be undertaken.

Appendix A – Tuxford Traffic and Analysis Technical Note

Tuxford Traffic Surveys and Analysis DR-12647 + DR-12733

Technical Note

FINAL

60571087

June 2024

Delivering a better world

Quality information

Prepared by	Checked by	Verified by	Approved by
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Revision History

Revision	Revision date	Details	Name	Position
000	May 2024	DRAFT	DG	AD
001	June 2024	DRAFT (with comments from QB)	DG	AD
002	June 2024	FINAL DRAFT	DG	AD
003	June 2024	FINAL	DG	AD

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Table of Contents

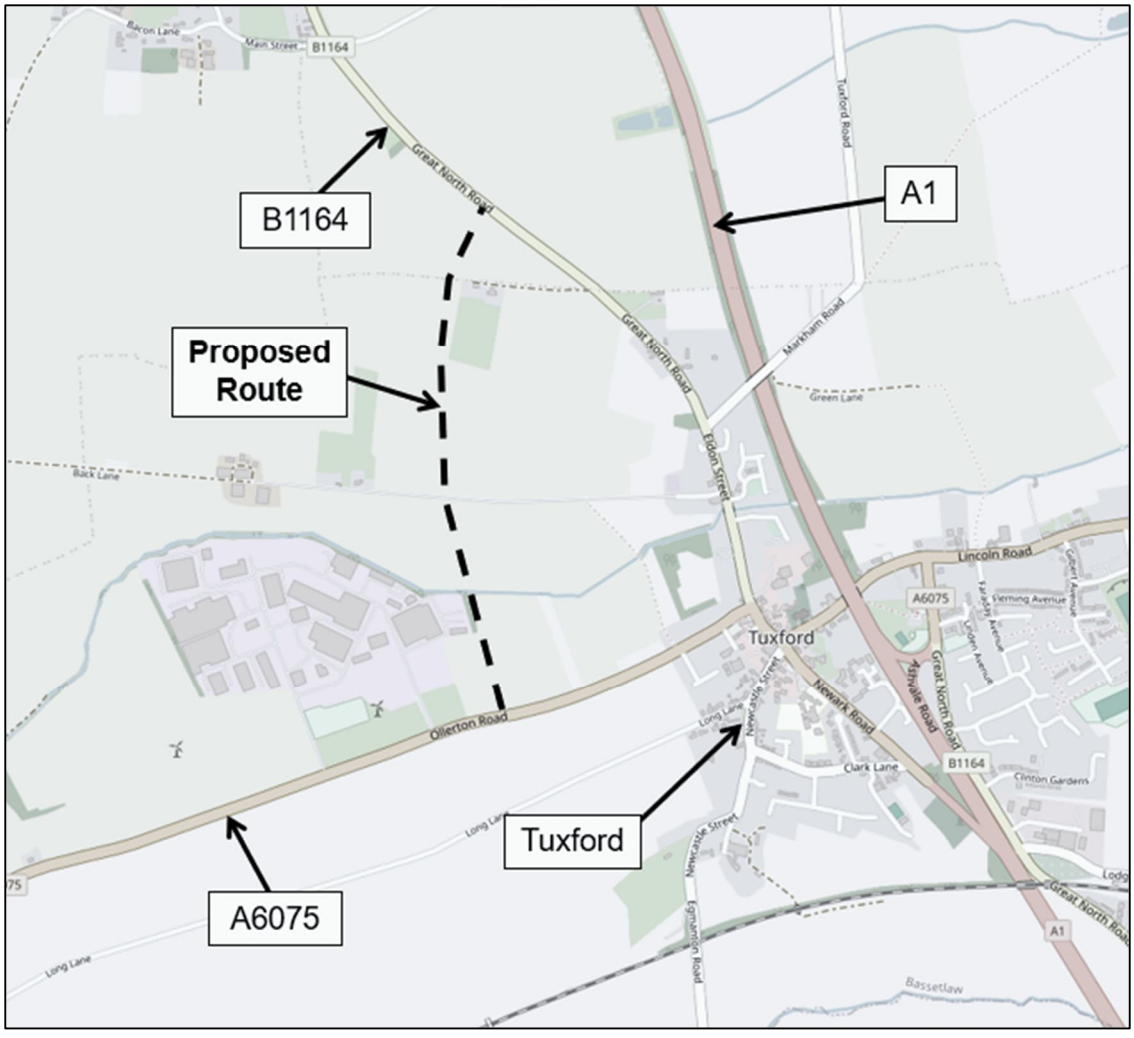
1 Introduction

1.1.1 AECOM has been commissioned by Locality to conduct traffic survey analysis in Tuxford, Nottinghamshire, to understand the potential traffic re-routeing that could be caused by the construction of a new road linking the A6075 to the west of the town and the B1164 to the north[1].

1.1.2 Tuxford sits astride the A1 dual carriageway, with the volume of HGV traffic accessing / exiting the A1 via the town[2] noted to be a key issue for residents living in the area. To mitigate the impact of HGVs, geometric options for a new road have been examined (see separate work, commissioned under the Masterplanning workpackage). The purpose of this technical note is to examine traffic data to identify the potential re-routeing of traffic (including HGVs) with a new road.

1.1.3 Figure 1.1 shows the indicative routing of the proposed new road. The route runs to the west of the town, connecting the A6075, to the east of the Walkers Industrial Estate, to the B1164, to the south of West Markham village. The route shown in Figure 1.1 is indicative at this stage, with a more definitive route becoming available at the design stage.

Figure 1.1: Proposed Location of New Road



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[1] A junction with Bevercotes Lane would also be required.
[2] With a Manual Classified Count (MCC) conducted as part of this study finding a total of 552 HGVs travelling northbound through Tuxford Highstreet (between the A6075 / Newcastle Street / Newark Road junction and A6075 / Ollerton Road junction) and 363 travelling southbound across a 12-hour period (7am – 7pm).

1.1.4 It is understood that the Town Council consider that the implementation of a new road could be supported by a weight limit (extent to be determined) within Tuxford town centre. Based on this, two scenarios have been analysed within this technical note:

- Scenario 1: Introduction of new road only.
- Scenario 2: Introduction of new road with additional town centre weight limit.

1.1.5 The purpose of this technical note is to describe the surveys and undertake initial analysis of potential re-routeing. It does not form a Transport Assessment suitable to support a planning application, and does not comprise a Business Case.

2 Traffic Surveys (Baseline)

2.1 Overview

2.1.1 The available budget for this work did not allow for conducting registration match surveys to definitively determine routeing of various types of vehicles through Tuxford. As such, an approach of conducting individual junction and road counts has been adopted.

2.1.2 Transport Appraisal Guidance (TAG) Unit M1.2 states that *"Surveys should typically be carried out during a 'neutral', or representative, month avoiding main and local holiday periods, local school holidays and half terms, and other abnormal traffic periods. Neutral periods are defined as Mondays to Thursdays from March through to November (excluding August), provided adequate lighting is available, and avoiding the weeks before/after Easter, the Thursday before and all of the week of a bank holiday, and the school holidays. Surveys may be carried out outside of these days/months, ensuring that the conditions being surveyed (e.g. traffic flow) are representative of the transport condition being analysed/modelled."*

2.1.3 Traffic surveys have been undertaken on roads and at key junctions to determine the existing (baseline) traffic volumes in and around Tuxford. The surveys consisted of five Automatic Traffic Counts (ATCs) and four Manual Classified Counts (MCCs). The locations of the surveys are shown in Figure 2.1. These surveys were conducted in March (a neutral month) outside of school holidays and at times when there was no poor weather such as snow or ice. As such, the surveys comply with the requirements set out in paragraph 2.1.2.

Figure 2.1: Count Locations

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2.2 Automatic Traffic Counts

2.2.1 Automatic Traffic Counts (ATCs) were conducted in Tuxford between 5th March – 11th March 2024. The five count locations, as illustrated in Figure 2.1, were as follows:

- A6075 Ollerton Road, to the west of the town centre, between The Pastures and Walkers Industrial Estate.
- Egmanton Road, to the south of the town centre, adjacent to the railway bridge.
- Newark Road, to the south of the town centre, between the A1 and Clark Lane.
- B1164 Ashvale Road, to the east of the town centre, between the Co-op Supermarket entrance and the A6075.
- A6075 Lincoln Road, to the east of the town centre, between Faraday Avenue and Gilbert Avenue.

2.2.2 The average traffic flows in the weekday AM peak hour (0800 – 0900hrs), weekday PM peak hour (1700 – 1800hrs) and weekday 12-hour period (0700 – 1900hrs), as recorded by the ATCs, are outlined in Tables 2.1 – 2.5. The tables present data for all vehicles, with data relating to HGVs shown in Appendix A.

Table 2.1: A6075 Ollerton Road ATC Data (Weekday Average), Vehicles

Vehicle Movement	AM Peak Hour (0800 – 0900)	PM Peak Hour (1700 – 1800)	12-hour count (0700 – 1900)
Total Vehicles: Westbound	272	216	2,204
Total Vehicles: Eastbound	202	218	1,947
Total Vehicles: Two-way	**474**	**434**	**4,151**

Table 2.2: Egmanton Road ATC Data (Weekday Average), Vehicles

Vehicle Movement	AM Peak Hour (0800 – 0900)	PM Peak Hour (1700 – 1800)	12-hour count (0700 – 1900)
Total Vehicles: Northbound	46	45	395
Total Vehicles: Southbound	40	39	368
Total Vehicles: Two-way	**86**	**84**	**763**

Table 2.3: Newark Road ATC Data (Weekday Averages), Vehicles

Vehicle Movement	AM Peak Hour (0800 – 0900)	PM Peak Hour (1700 – 1800)	12-hour count (0700 – 1900)
Total Vehicles: Northbound	111	117	1,032
Total Vehicles: Southbound	1	4	23
Total Vehicles: Two-way	**112**	**121**	**1,055**

Table 2.4: B1164 Ashvale Road ATC Data (Weekday Average), Vehicles

Vehicle Movement	AM Peak Hour (0800 – 0900)	PM Peak Hour (1700 – 1800)	12-hour count (0700 – 1900)
Total Vehicles: Northbound	225	233	2,105
Total Vehicles: Southbound	203	218	2,096
Total Vehicles: Two-way	**428**	**451**	**4,201**

Table 2.5: A6075 Lincoln Road ATC Data (Weekday Average), Vehicles

Vehicle Movement	AM Peak Hour (0800 – 0900)	PM Peak Hour (1700 – 1800)	12-hour count (0700 – 1900)
Total Vehicles: Westbound	424	254	2,592
Total Vehicles: Eastbound	437	288	2,768
Total Vehicles: Two-way	**861**	**542**	**5,360**

2.2.3 To put these figures into context, the *Design Manual for Roads and Bridges* (DMRB) has previously stated that a two-lane single carriageway road should be built to accommodate flow ranges up to 13,000 AADT. The highest recorded two-way AADT flow on all routes surveyed occurred on the A6075 Lincoln Road. The AADT was 5,496, which is lower than the threshold set out in DMRB. A further Department for Transport (DfT) count exists for 2022 on the A6075 (directly east of Newark Road) and gives an AADT of 7,906. This indicates that all routes surveyed are operating below DMRB guidance.

2.3 Manual Classified Counts

2.3.1 Manual Classified Counts (MCCs) were conducted in Tuxford on Tuesday 5th March 2024, between 0700 – 1900 hrs. The four count locations, as illustrated in Figure 2.1, were as follows:

- A6075 / B1164 Eldon Street priority junction.
- A6075 / Newark Road and Newark Road / Newcastle Street priority junctions.
- B1164 Ashvale Road / A1 Southbound on and off-slips priority junctions.
- A6075 Lincoln Road / B1164 Ashvale Road priority junction.

2.3.2 Two MCC sites were located immediately adjacent to ATC sites (i.e. with no junctions in between), meaning the flows recorded at both sites can be directly compared. This comparison is illustrated in Table 2.6.

2.3.3 The data in Table 2.6 shows that the flows are comparable in all locations and time periods, with the difference between the (weekday average) ATC and (one day) MCC data being less than 15% in all time periods.

Table 2.6: ATC & MCC Data Comparison (vehicles)

Location	Time Period	ATC 5-day Weekday Average Flows	MCC 1-Day Flows	Difference	% Difference
A6075 Ollerton Road (W/B)	AM Peak Hour (0800 – 0900)	272	284	+12	+4%
	PM Peak Hour (1700 – 1800)	216	225	+9	+4%
	12-hour (0700 – 1900)	2,204	2,284	+80	+4%
A6075 Ollerton Road (E/B)	AM Peak Hour (0800 – 0900)	202	206	+4	+2%
	PM Peak Hour (1700 – 1800)	218	233	+15	+7%
	12-hour (0700 – 1900)	1,947	2,035	+88	+5%
B1174 Ashvale Road (N/B)	AM Peak Hour (0800 – 0900)	225	233	+8	+4%
	PM Peak Hour (1700 – 1800)	233	266	+33	+14%
	12-hour (0700 – 1900)	2,105	2,204	+99	+5%
B1174 Ashvale Road (S/B)	AM Peak Hour (0800 – 0900)	203	223	+20	+10%
	PM Peak Hour (1700 – 1800)	218	216	-2	-1%
	12-hour (0700 – 1900)	2,096	2,122	+26	+1%

2.3.4 The MCC recorded higher HGV flows than the ATCs, likely owing to the automatic nature of the classification system used for ATCs (whereas MCCs are manually classified using a video-based approach). HGV flows derived from MCC analysis are considered more representative and have therefore been taken forward into the analysis throughout the remainder of this technical note.

2.3.5 Full survey data (including HGVs) are shown in Appendix A, with data presented in PCUs[3].

[3] A Passenger Car Unit (PCU) is calculated by assigning different types of vehicles factors depending on the amount of road space they occupy. For example, a car is valued at 1 PCU and an OGV2 (the largest classification of HGV) is recorded as 2.3 PCUs.

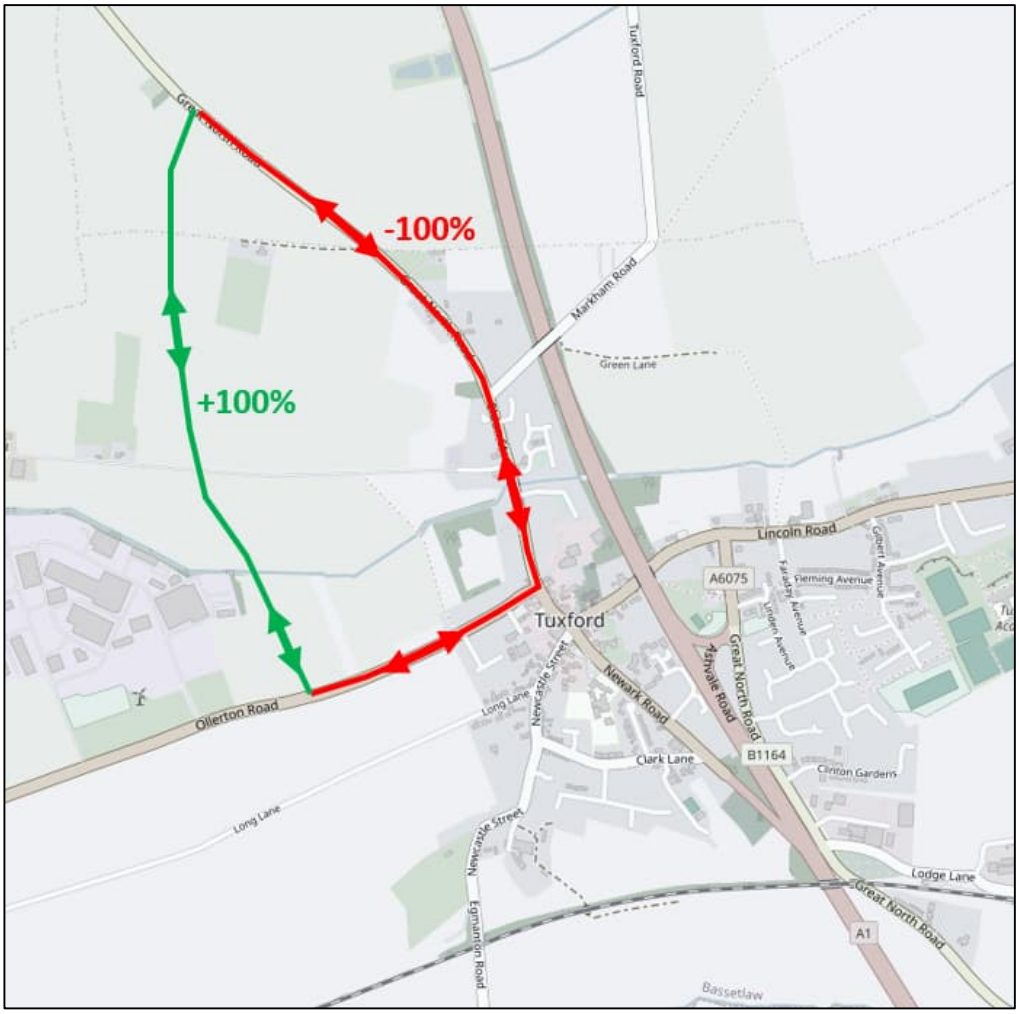
3 Scenario 1: Introduction of New Road

3.1 Overview

3.1.1 This section examines potential traffic re-routeing should the proposed new road be constructed. The analysis considers the likely reassignment of existing traffic associated with the new road only (i.e. no reassignment associated with the introduction of town centre weight limits has been considered within this section, nor has any development traffic associated with future developments been considered).

3.1.2 To represent the 'best case' scenario, it has been assumed that all vehicles currently travelling between the A6075 and B1164 would utilise the proposed new road (100% utilisation) due to the potential time advantage. This is illustrated in Figure 3.1. In reality, some vehicles would likely travel via the A6075 (Ollerton Road) / Eldon Street junction even after the new road is constructed (for example those travelling via Markham Road to access East Markham), though this percentage has not been calculated without Origin-Destination surveys.

Figure 3.1: Traffic Flow Reassignment (Scenario 1 (New Road only))



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3.1.3 Analysis within this section is based upon baseline (observed) traffic movements, and, at this

stage of analysis, no consideration of future traffic growth has been undertaken[4].

3.2 Re-Routeing of Traffic Flows

3.2.1 Table 3.1 summarises the reassignment of traffic flows across the AM, PM and 12-hour period for all vehicles. The table shows the Baseline (existing) traffic flow, the proposed flow should the new road be constructed (Scenario 1), and the difference between the Baseline and Scenario 1.

3.2.2 The data is given in Passenger Car Units (PCUs), whereby different types of vehicles are assigned factors depending on the amount of road space they occupy. For example, a car is valued at 1 PCU and an OGV2 (the largest classification of HGV) is recorded as 2.3 PCUs.

3.2.3 For the avoidance of doubt, the figures show the total movements to / from each arm (i.e. the summation of the inflow and outflow movements). There is not expected to be any change in total movements to / from the southern arm of the junction (A6075 Eldon Street), and therefore this is not included within Table 3.1.

3.2.4 The table shows that the introduction of a new road could lead to a reduction of up to 20% PCUs on the northern arm (B1164 Eldon Street) and up to 23% PCUs on the western arm (A6075 Ollerton Road) across an average 12-hour period (0700 – 1900hrs).

Table 3.1: Traffic Flow Re-Routeing Scenario 1 (New Road Only) (All Vehicles - PCUs), Two-Way Flows

Arm	Time Period	Baseline Flow (PCUs)	Scenario 1 Flow (PCUs)	Difference (PCUs)	% Difference
B1164 Eldon Street	AM Peak Hour (0800 – 0900)	630	522	-108	-17%
	PM Peak Hour (1700 – 1800)	596	454	-142	-24%
	12-hour (0700 – 1900)	**5,450**	**4,342**	**-1,108**	**-20%**
A6075 Ollerton Road	AM Peak Hour (0800 – 0900)	540	432	-108	-20%
	PM Peak Hour (1700 – 1800)	483	341	-142	-29%
	12-hour (0700 – 1900)	**4,760**	**3,652**	**-1,108**	**-23%**

3.2.5 Table 3.2 summarises the potential reassignment of traffic flows at the A6075 / B1164 junction for HGVs only. The table shows the total number of HGVs making inflow / outflow movements at each arm in PCUs. No change is expected at the southern arm (A6075 Eldon Street) and therefore this has been excluded from the table.

3.2.6 The table shows the northern arm (B1164 Eldon Street) could lead to a reduction in HGVs of up to 47% PCUs, whilst the A6075 Ollerton Road arm could lead to a reduction of up to 29% PCUs (assuming 100% utilisation of the new road). This is a ‘best case’ scenario in terms of forecasting how much traffic would use the new road.

[4] i.e. no consideration has been taken for proposed residential or employment developments, including Strategic Housing Allocations such as that to the south of the A6075 Ollerton Road (Policy Reference HS14 within the Bassetlaw Local Plan).

Table 3.2: Traffic Flow Re-Routeing Scenario 1 (New Road Only) (HGVs Only - PCUs), two-way flows

Arm	Time Period	Baseline Flow (PCUs)	Scenario 1 Flow (PCUs)	Difference (PCUs)	% Difference
B1164 Eldon Street	AM Peak Hour (0800 – 0900)	47	23	-24	-52%
	PM Peak Hour (1700 – 1800)	39	23	-16	-41%
	12-hour (0700 – 1900)	**546**	**292**	**-254**	**-47%**
A6075 Ollerton Road	AM Peak Hour (0800 – 0900)	103	78	-24	-24%
	PM Peak Hour (1700 – 1800)	46	30	-16	-34%
	12-hour (0700 – 1900)	**878**	**624**	**-254**	**-29%**

4 Scenario 2: Introduction of New Road + Weight Limit

4.1 Overview

4.1.1 It is understood that, in addition to a new road to the west of the town, the introduction of a town centre weight limit has also been raised and is being considered by the Town Council. This work is at the conceptual stage, and no design or feasibility work has been undertaken to date.

4.1.2 The purpose of this section is to conduct a high-level examination of the anticipated re-routeing of traffic flows should a weight limit in the town centre be introduced in addition to the new road. In the absence of design work, it has been assumed that the limits of a weight restriction would be imposed on the stretch of the A6075 Eldon Street passing through the main town centre shopping area, as shown in Figure 4.1. For the avoidance of doubt, no detailed consideration of the design or impacts on individual properties / stakeholders of the weight limit has been conducted – nor has any consultation with either the local highway authority, Nottinghamshire County Council or the strategic highway authority, National Highways.

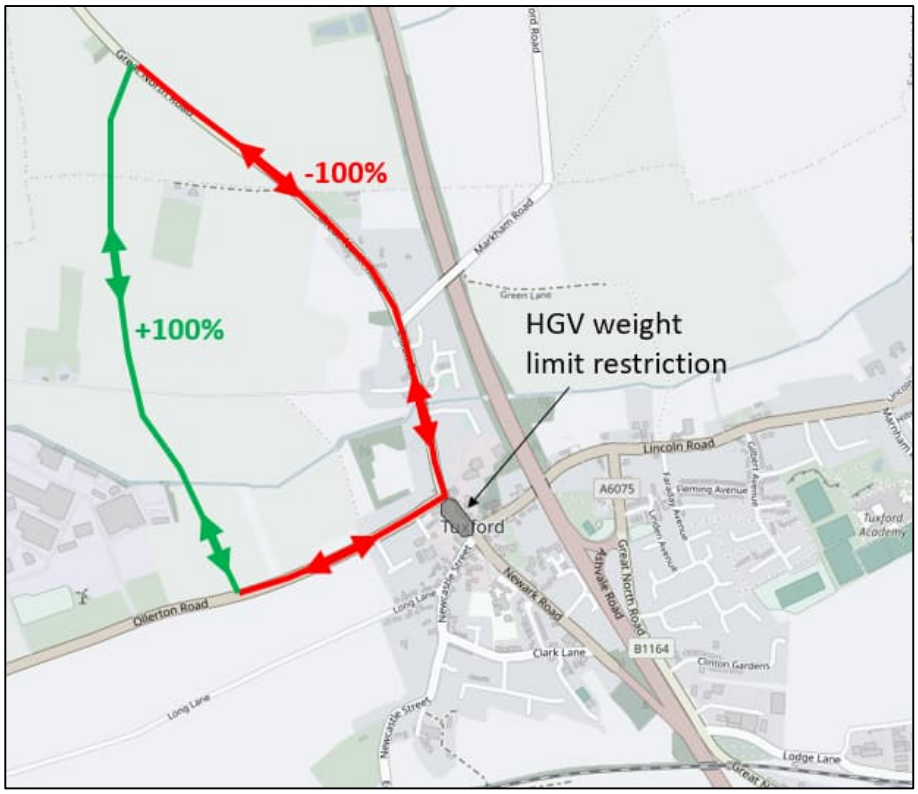
4.1.3 It has been assumed that weight limits would apply to all HGVs (i.e. OGV1 and OGV2 classifications). For the purposes of this analysis, it has been assumed that Public Service Vehicles (PSVs) (including buses) as well as cars, vans and HGVs accessing businesses and residential properties along the A6075 Eldon Street would be exempt. As per Scenario 1, 100% utilisation of the new route is assumed.

4.1.4 Most HGVs would be expected to re-route. Any diversions would increase journey lengths, with increased journey lengths (and time[5]) having implications for business operating costs, as well as vehicle operating costs. The economic impact associated with the diversion would need to be assessed further if the scheme were to progress.

4.1.5 This section examines the localised traffic re-routeing of Scenario 2 (New Road + Weight Limit), considering the anticipated traffic re-routeing at the A6075 / B1164 junction (to the north of the weight limit zone) and A6075 / Newark Road / Newcastle Street junction (to the south of the weight limit zone) only. Should the scheme progress, wider traffic reassignment impacts would need to be examined, and there would be a need for both non-statutory and statutory consultation.

[5] No analysis on the impact upon journey times has been conducted as part of this study, however it would be required should the scheme progress to Business Case. Tuxford Town Council's independent manual calculations indicates that travel times may be similar or only slightly higher. However, we cannot determine this from this dataset.

Figure 4.1: Scenario 2: Potential new road location and town centre weight limit



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4.1.6 Analysis within this section is based upon baseline (observed) traffic movements, and, at this stage of analysis, no consideration of future traffic growth has been undertaken.

4.2 Re-routeing of Traffic Flows

4.2.1 Table 4.1 summarises the localised re-assignment of traffic flows across the 12-hour period at the A6075 / B1164 junction (to the north of the weight limit zone) and A6075 / Newark Road / Newcastle Street junction (to the south of the weight limit zone), assuming that none of the traffic is exempt. The table shows the total movement for each arm at the junction (i.e. the summation of arm inflow / outflow) in PCUs. The table includes all vehicle types (incl. HGVs).

4.2.2 The data is given in Passenger Car Units (PCUs), whereby different types of vehicles are assigned factors depending on the amount of road space they occupy. For example, a car is valued at 1 PCU and an OGV2 (the largest classification of HGV) is recorded as 2.3 PCUs.

4.2.3 The table shows that the introduction of a town centre weight limit in addition to the construction of a new road to the west of the town could lead to up to a 36% reduction in PCUs (on the A6075 Ollerton Road arm, assuming 100% utilisation of the new road), with the A6075 / B1164 junction seeing the greatest re-routeing (owing to the new road and weight limit). The overall traffic reduction at the A6075 / Newark Road / Newcastle Street is expected to be more limited.

Table 4.1: Traffic Flow Re-Routeing (Scenario 2 (New Road + Weight Limit)) (All Vehicles – PCUs (12-hour)), two-way flows

Junction	Arm	Baseline Flow (PCUs)	Scenario 2 Flow (PCUs)	Difference (PCUs)	% Difference
A6075 / B1164	B1164 Eldon Street (N)	5,450	4,050	-1,399	-26%
	A6075 Eldon Street (S)	7,994	7,078	-916	-11%
	A6075 Ollerton Road (W)	4,760	3,028	-1,732	-36%
A6075 / Newark Road / Newcastle Street	A6075 Eldon Street (N)	7,948	7,032	-916	-12%
	A6075 Lincoln Road (E)	7,815	7,414	-401	-5%
	Newark Road (S)	2,548	2,542	-6	0%
	Newcastle Street (W)	1,778	1,761	-17	-1%

4.2.4 Similar analysis has been conducted for HGV movements only (in PCUs). Table 4.2 shows that the construction of a new road combined with weight restrictions could eliminate HGV movements (aside from local deliveries, with exceptions for access) at the A6075 / B1164 (assuming 100% utilisation of the new road). The introduction of a weight limit could also see a large re-routeing of HGV movements at the A6075 / Newark Road / Newcastle Street junction.

Table 4.2: Traffic Flow Re-routeing (Scenario 2 (New Road + Weight Limit)) (HGVs – PCUs (12-hour)), two-way flows

Junction	Arm	Baseline Flow (PCUs)	Scenario 2 Flow (PCUs)	Difference (PCUs)	% Difference
A6075 / B1164	B1164 Eldon Street (N)	546	0	-546	-100%
	A6075 Eldon Street (S)	916	0	-916	-100%
	A6075 Ollerton Road (W)	878	0	-878	-100%
A6075 / Newark Road / Newcastle Street	A6075 Eldon Street (N)	916	0	-916	-100%
	A6075 Lincoln Road (E)	762	361	-401	-53%
	Newark Road (S)	361	354	-6	-2%
	Newcastle Street (W)	61	44	-17	-27%

5 Development Traffic

5.1 Overview

5.1.1 It is understood that the construction of a new road to the west of the town could unlock approximately 19 hectares of development land. This section provides and initial analysis of the traffic flows associated with the additional vehicular trips generated by this land parcel.

5.2 Site Context

5.2.1 The potential development land is located to the west of Tuxford and immediately to the north of the existing Walkers Industrial Estate. The site is largely agricultural in nature.

5.2.2 The site spans approximately 19 hectares (190,000m^2). For the purposes of this technical note, it is assumed that:

- the developable land parcel would be allocated for employment purposes (B2 & B8);
- access to the site would be via the proposed new road;
- a development footprint area of 40% has been applied, resulting in a developable area of 7.6 hectares, or 76,000 sqm. The remainder of the site being roads, landscaping etc.

5.2.3 No discussions have taken place with the landowner, planning authority or highway authority, and this technical note does not form a Transport Assessment and is not suitable for supporting a planning application. As such, the purpose of this section is illustrative only.

5.3 Trip Generation and Distribution

5.3.1 The *Trip Rate Information Computer System* (TRICS) software has been used to estimate the number of trips that could be generated by and attracted to the site, assuming the employment development is split evenly between the B2 and B8 user classes.

5.3.2 The TRICS arrivals / departures are outlined in Table 5.1 and show separate figures for all vehicles (i.e. including employees travelling to / from site, as well as vehicles associated with business operations), as well as for HGVs only.

Table 5.1: TRICS arrivals / departures for Tuxford development land (PCUs)

Vehicle Type	User Class	AM Peak Hour (0800 – 0900)		PM Peak Hour (1700 – 1800)		12 Hour Rate (0700 – 1900)	
		Arrivals (PCUs)	Departures (PCUs)	Arrivals (PCUs)	Departures (PCUs)	Arrivals (PCUs)	Departures (PCUs)
All vehicles	B2 (38,000m^2)	159	67	54	141	1,156	1,160
	B8 (38,000m^2)	16	10	12	12	159	163
	Site Total	**175**	**77**	**66**	**153**	**1,315**	**1,322**
HGVs Only	B2 (38,000m^2)	22	16	11	10	227	217
	B8 (38,000m^2)	9	8	9	6	101	101
	Site Total	**31**	**24**	**20**	**16**	**328**	**317**

5.3.3 Baseline traffic flow data collected from the MCCs has been used to estimate how the development flows may distribute across the seven main routes in / out of Tuxford. Table 5.2 illustrates this split, which differs for HGVs and all vehicles.

Table 5.2: Traffic distribution between routes to / from Tuxford

Route	% All Vehicles	% HGVs
B1164 Eldon Street (to / from Markham Moor & A1 North)	24%	26%
A1 North (to / from Doncaster)	4%	4%
A6075 Lincoln Road (to / from Lincoln)	26%	8%
B1164 Ashvale Road (to / from Sutton-on-Trent)	13%	20%
A1 South (to / from Newark)	9%	19%
Egmanton Road (to / from Egmanton)	4%	1%
A6075 Ollerton Road (to / from Ollerton)	21%	22%
Total	**100%**	**100%**

5.3.4 The re-routeing of the additional traffic on the local highway network has been assessed for two scenarios:

- Scenario 1: Likely routeing if a new road (only) is constructed.
- Scenario 2: Likely routing if a new road is constructed, with additional town centre weight limit limiting HGV movements though the town centre.

5.4 Traffic Re-Routeing – Scenario 1 (New Road only)

5.4.1 The following section analyses the likely routing of the development traffic should only the new road be constructed (i.e. no additional town centre weight limits). Under this scenario, development traffic (including HGVs) can route through the town centre to access the site.

5.4.2 Table 5.3 summarises the localised traffic flows, showing the change in traffic flow at the A6075 / B1164 junction and at the A6075 / Newark Road / Newcastle Street junction for all vehicles (in PCUs) across an average 12-hour period.

5.4.3 The data is given in Passenger Car Units (PCUs), whereby different types of vehicles are assigned factors depending on the amount of road space they occupy. For example, a car is valued at 1 PCU and an OGV2 (the largest classification of HGV) is recorded as 2.3 PCUs.

5.4.4 The table indicates that the development land could lead to an increase in trips passing through the town centre. On the A6075 (Eldon Street) this increase equates to approximately 1,413 additional two-way PCUs (18% increase).

Table 5.3: Scenario 1 ; 12 Hour Traffic flows associated with additional development trips (All vehicles – PCUs), two-way flows

Junction	Arm	Baseline Flow (PCUs)	Development (New Road only)(PCUs)	Difference (PCUs)	% Difference
A6075 / B1164	B1164 Eldon Street (N)	5,450	6,156	707	+13%
	A6075 Eldon Street (S)	7,994	9,407	1413	+18%
	A6075 Ollerton Road (W)	4,760	5,466	707	+15%
A6075 / Newark Road / Newcastle Street	A6075 Eldon Street (N)	7,948	9,361	1413	+18%
	A6075 Lincoln Road (E)	7,815	9,010	1195	+15%
	Newark Road (S)	2,548	2,670	122	+5%
	Newcastle Street (W)	1,778	1,874	96	+5%

5.4.5 Similar analysis has been conducted for HGVs only, with outputs shown in Table 5.4. The table indicates that the volume of HGVs travelling through the town could increase by a maximum of 36% on A6075 (Eldon Street) should the development unlocked by the new road construction come to fruition. This equates to approximately 326 additional HGV PCUs across the 12-hour period.

Table 5.4: Scenario 1: 12 Hour Traffic flows associated with additional development trips (HGVs – PCUs), two-way flows

Junction	Arm	Baseline Flow (PCUs)	Development (New Road only)(PCUs)	Difference (PCUs)	% Difference
A6075 / B1164	B1164 Eldon Street (N)	546	709	163	+30%
	A6075 Eldon Street (S)	916	1242	326	+36%
	A6075 Ollerton Road (W)	878	1041	163	+19%
A6075 / Newark Road / Newcastle Street	A6075 Eldon Street (N)	916	1242	326	+36%
	A6075 Lincoln Road (E)	762	1021	259	+34%
	Newark Road (S)	361	423	63	+17%
	Newcastle Street (W)	61	66	5	+8%

5.4.6 Further analysis would be required to determine the impact of the additional trips on junction capacity at key junctions within Tuxford, as well as upon the wider highway network (particularly at the M1 Markham Moor Interchange).

5.5 Traffic Re-Routeing – Scenario 2

5.5.1 The introduction of a town centre weight limit would prohibit all HGVs associated with the potential development from travelling through the town centre (as per Figure 4.1.). Cars / vans associated with the site would still be allowed to route through Tuxford town centre.

5.5.2 Table 5.5 summarises the routeing of development trips across the 12-hour period at the A6075 / B1164 junction (to the immediate north of the weight limit zone) and at the A6075 / Newark Road / Newcastle Street junction (to the south of the zone).

5.5.3 Even with the construction of a new road and a town centre weight limit, the trip generation associated with the unlocked development land could lead to a 14% increase in the volume of traffic through the town centre (A6075 Eldon Street).

Table 5.5: Scenario 2 : 12 Hour Traffic flows associated with additional development trips (New Road + weight limit) (All vehicles – PCUs), two-way flows

Junction	Arm	Baseline Flow (PCUs)	Development (New Road + Weight limits)(PCUs)	Difference (PCUs)	% Difference
A6075 / B1164	B1164 Eldon Street (N)	5,450	5,993	543	+10%
	A6075 Eldon Street (S)	7,994	9,081	1087	+14%
	A6075 Ollerton Road (W)	4,760	5,303	543	+11%
A6075 / Newark Road / Newcastle Street	A6075 Eldon Street (N)	7,948	9,035	1087	+14%
	A6075 Lincoln Road (E)	7,815	8,758	943	+12%
	Newark Road (S)	2,548	2,607	60	+2%
	Newcastle Street (W)	1,778	1,875	98	+5%

5.5.4 No increase in HGV movements is expected through these junctions owing to the town centre weight limit (aside from local deliveries, with exceptions for access). All development HGVs would instead route to / from the north (B1164) via the A1 Markham Moor interchange.

5.5.5 Further analysis would be required to establish the wider impact of this reassignment, particularly on junction capacity at the A1 Markham Moor interchange as well as junctions within Tuxford, and any environmental impact associated with the increase in traffic flow on the B1164.

6 Overall Change in Traffic Flows

6.1.1 Table 6.1 summarises traffic flow at each of the localised junctions (the A6075 / B1164 junction (to the north of the weight limit zone) and A6075 / Newark Road / Newcastle Street junction (to the south of the weight limit zone)) in the following scenarios:

- Baseline: Showing existing traffic flow
- Scenario 1 (No Development): Traffic flow should a new road be constructed, but no additional development occurs on the 'unlocked' land.
- Scenario 2 (No Development): Traffic flow should a new road be constructed and a town centre weight limit imposed, but no additional development occurs on the 'unlocked' land.
- Scenario 1 + Development: Traffic flow should a new road be constructed, and development occurs on the 'unlocked' land.
- Scenario 2 + Development: Traffic flow should a new road be constructed and a town centre weight limit imposed, and development occurs on the 'unlocked' land.

Table 6.1: Percentage change in traffic flow (all vehicles and HGVs only) for each scenario (12-hour)

	A6075 / B1164		A6075 / Newark Road / Newcastle Street	
	All Vehicles (PCUs)	HGVs (PCUS)	All Vehicles (PCUs)	HGVs (PCUS)
Baseline				
Scenario 1 (New Road only)	-12%	-22%	0%	0%
Scenario 2 (New Road + weight limit)	-22%	-100%	-6%	-60%
Scenario 1 + Development	+3%	+6%	+14%	+31%
Scenario 2 + Development	-10%	-100%	+5%	-59%

6.1.2 The data indicates that the construction of a new road (only) could lead to a reduction in both all vehicles and HGVs at the A6075 / B1164 junction; however, this assumes 100% utilisation of the new road link (whereas, in reality, this may not occur). Furthermore, the new road re-routeing is very localised, with no recorded change in traffic volumes at the A6075 / Newark Road / Newcastle Street junction to the south of the town centre.

6.1.3 Should a weight limit be introduced in addition to the new road route, a wider impact could be expected owing to the banning of HGVs through the town centre. The weight limit could lead up to a 100% reduction of HGVs at the A6075 / B1164 junction (aside from local deliveries, with exceptions for access), whilst the A6075 / Newark Road / Newcastle Street junction could see a 60% reduction to HGVs. For 'all vehicles', these figures are 22% and 6% respectively. Further traffic analysis would be required to determine if these reductions would have a significant impact (particularly on junction capacity).

6.1.4 It is expected that the construction of a new road link could unlock approximately 19 hectares of development land to the west of Tuxford. A development of this size could be expected to generate approximately 2,637 two-way PCUs (all vehicles) across the 12-hour period (including 645 two-way HGVs).

6.1.5 A high-level assignment of these trips across the town shows that, should a new road (only) be constructed, the development would lead to an increase in traffic flow through the town centre. This is expected to be in the region of 610 additional PCUs (all vehicles) at the A6075 / B1164 junction and 2,830 additional PCUs (all vehicles) at the A6075 / Newark Road / Newcastle Street junction across the 12-hour period (a 3% and 14% increase, respectively). Considering HGV volumes, these are expected to increase by 144 at the A6075 / B1164 junction and 652 at the A6075 / Newark Road / Newcastle Street junction. This equates to a

6% and 31% increase in HGVs.

6.1.6 Should a town centre weight limit be introduced in addition to a new road, the impact of these additional development trips would be mitigated, with a PCU decrease of 10% at the A6075/B1164 and an increase of 5% at the A6075 / Newark Road / Newcastle Street junction for all vehicles. HGVs could also be reduced by up to 100% (due to the compounded impact of the weight limit and new road link) and 59% respectively.

7 Summary and Way Forward

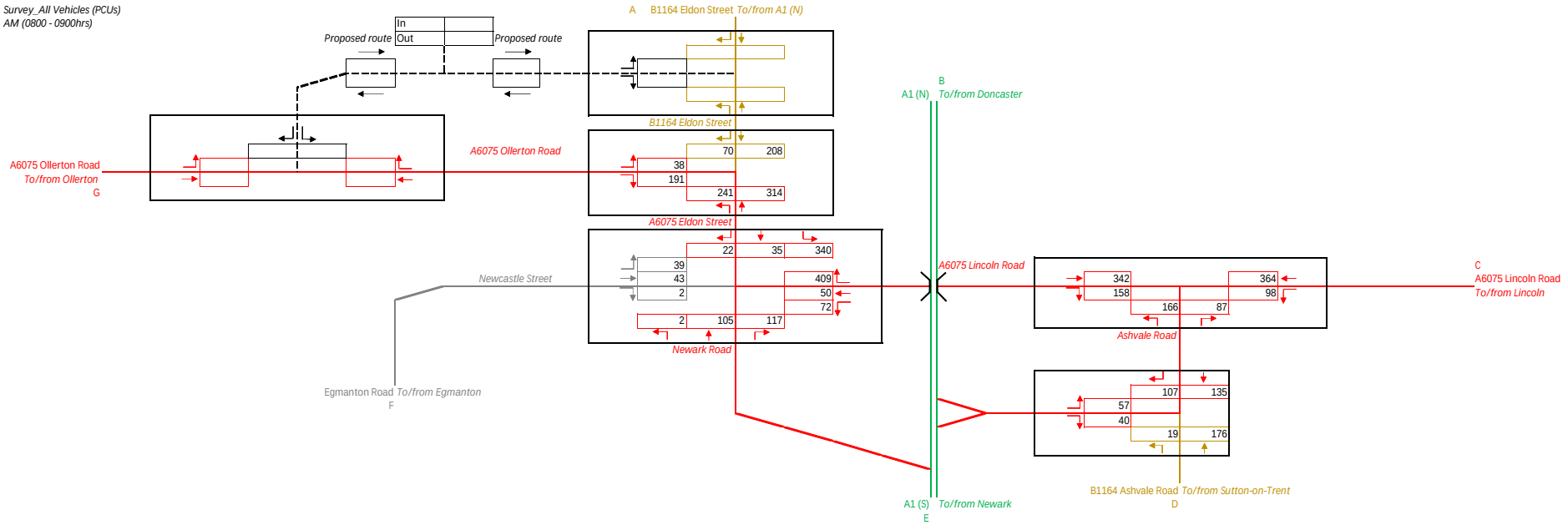
7.1.1 This technical note has been produced to understand the potential impacts of the construction of a new road linking the A6075 to the west of the town and the B1164 to the north. The note presents findings of traffic surveys conducted across the town to establish baseline traffic levels.

7.1.2 Analysis indicates that the construction of a new road (only) could lead to a localised reduction in traffic at the A6075 / B1164 junction; however, there is not expected to be any further reduction in trips at other routes and junctions across the town. The introduction of a town centre weight limit in addition to a new road could have a wider impact upon traffic reduction throughout the town owing to the reassignment of HGVs. It should be noted that this analysis does not take consideration of any future housing or employment growth in the area, and further analysis would be required using a dynamic reassignment model (e.g. SATURN) to understand the wider impacts.

7.1.3 It is expected that the construction of a new road link would unlock approximately 19 hectares of development land to the west of Tuxford. A development of this size could be expected to generate approximately 2,637 two-way PCUs (all vehicles) across the 12-hour period (including 645 two-way HGVs). The additional development trips could lead to an increase in traffic through the town centre, even with the construction of a new road link and a town centre weight limit.

7.1.4 As is noted earlier in this report, any new road or weight limit would require extensive consultation with both the local and strategic highway authorities, and the local planning authority. Given the volumes of traffic that could be re-routed (and long diversion routes for some HGV traffic, which may create a monetised operating / time cost in any business case), it is unlikely that this is a scheme that would be a priority for the local highway authority using local funds. Funding from private sources might be available if the land was developed for employment use; however, such development would also add trips (including HGVs) to the road network through Tuxford.

Appendix A – Traffic Surveys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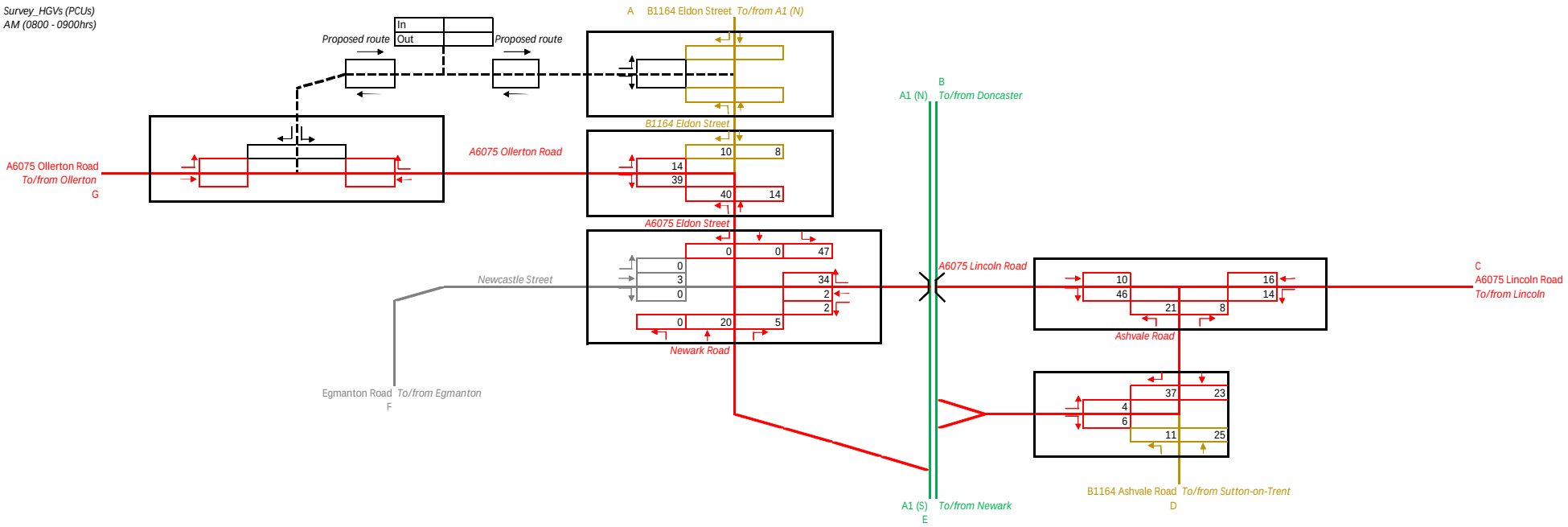
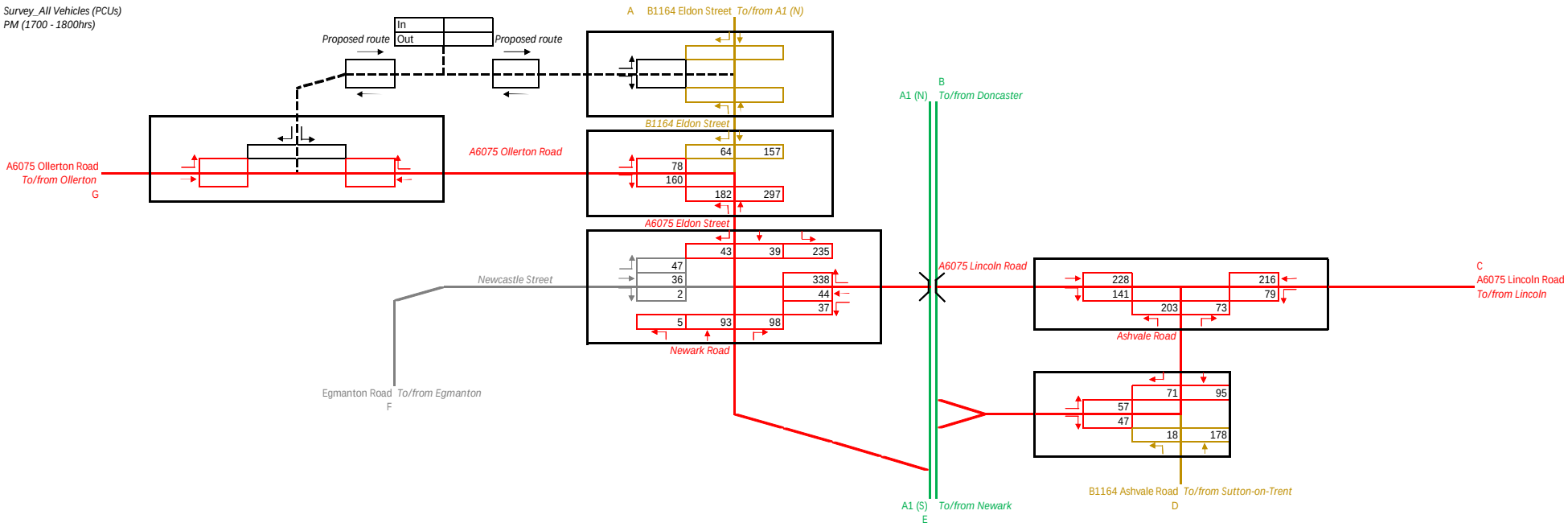
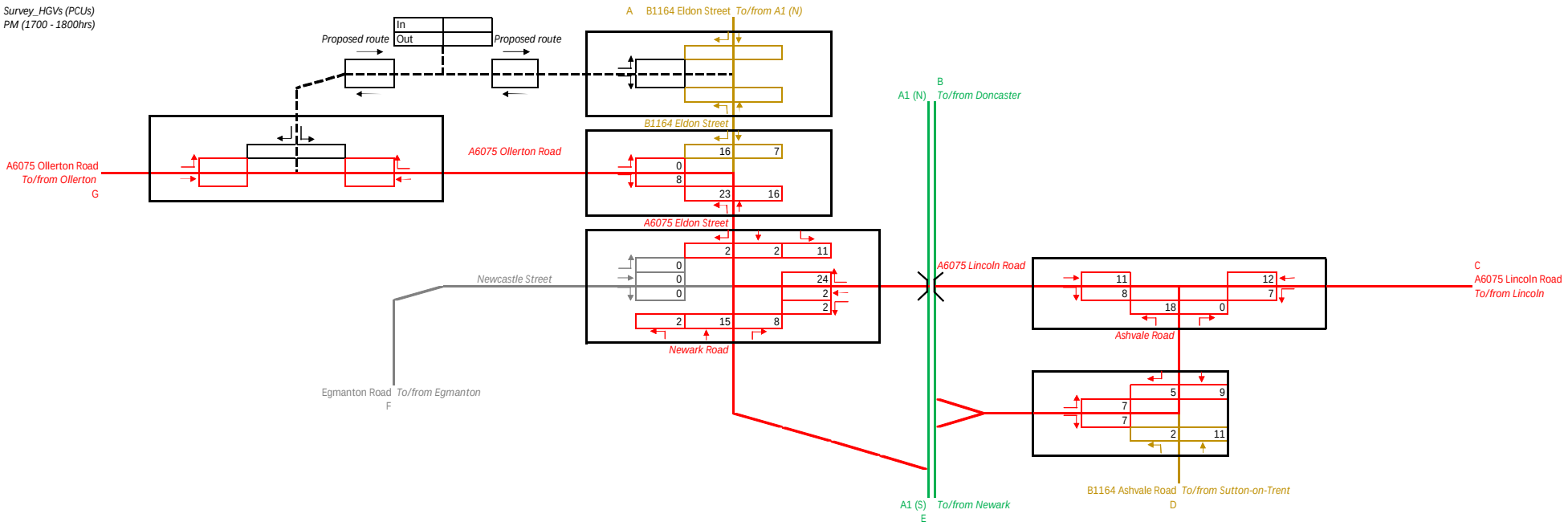
AM (0800 - 0900hrs)
In
Out
Proposed route
Proposed route
A
B1164 Eldon Street To/from A1 (N)
B
A1 (N) To/from Doncaster
B1164 Eldon Street
A6075 Ollerton Road
A6075 Ollerton Road
To/from Ollerton
G
70
208
38
191
241
314
A6075 Eldon Street
22
35
340
39
43
2
409
50
72
Newcastle Street
2
105
117
Newark Road
A6075 Lincoln Road
342
158
364
98
166
87
C
A6075 Lincoln Road
To/from Lincoln
Ashvale Road
107
135
57
40
19
176
Egmanton Road To/from Egmanton
F
B1164 Ashvale Road To/from Sutton-on-Trent
D
A1 (S) To/from Newark
E


Survey_HGVs (PCUs)
AM (0800 - 0900hrs)
In
Out
Proposed route
Proposed route
A
B1164 Eldon Street
To/from A1 (N)
B
A1 (N)
To/from Doncaster
B1164 Eldon Street
A6075 Ollerton Road
A6075 Ollerton Road
To/from Ollerton
G
10
8
14
39
40
14
A6075 Eldon Street
0
0
47
0
3
0
34
2
2
Newcastle Street
A6075 Lincoln Road
0
20
5
Newark Road
10
16
46
14
21
8
C
A6075 Lincoln Road
To/from Lincoln
Ashvale Road
37
23
4
6
11
25
Egmanton Road
To/from Egmanton
F
B1164 Ashvale Road
To/from Sutton-on-Trent
D
A1 (S)
To/from Newark
E


Survey_All Vehicles (PCUs)
PM (1700 - 1800hrs)
In
Out
Proposed route
Proposed route
A B1164 Eldon Street To/from A1 (N)
B
A1 (N) To/from Doncaster
B1164 Eldon Street
A6075 Ollerton Road
A6075 Ollerton Road
To/from Ollerton
G
64
157
78
160
182
297
A6075 Eldon Street
43
39
235
47
36
2
338
44
37
Newcastle Street
A6075 Lincoln Road
C
A6075 Lincoln Road
To/from Lincoln
228
216
141
79
203
73
Ashvale Road
Newark Road
Egmanton Road To/from Egmanton
F
71
95
57
47
18
178
B1164 Ashvale Road To/from Sutton-on-Trent
D
A1 (S) To/from Newark
E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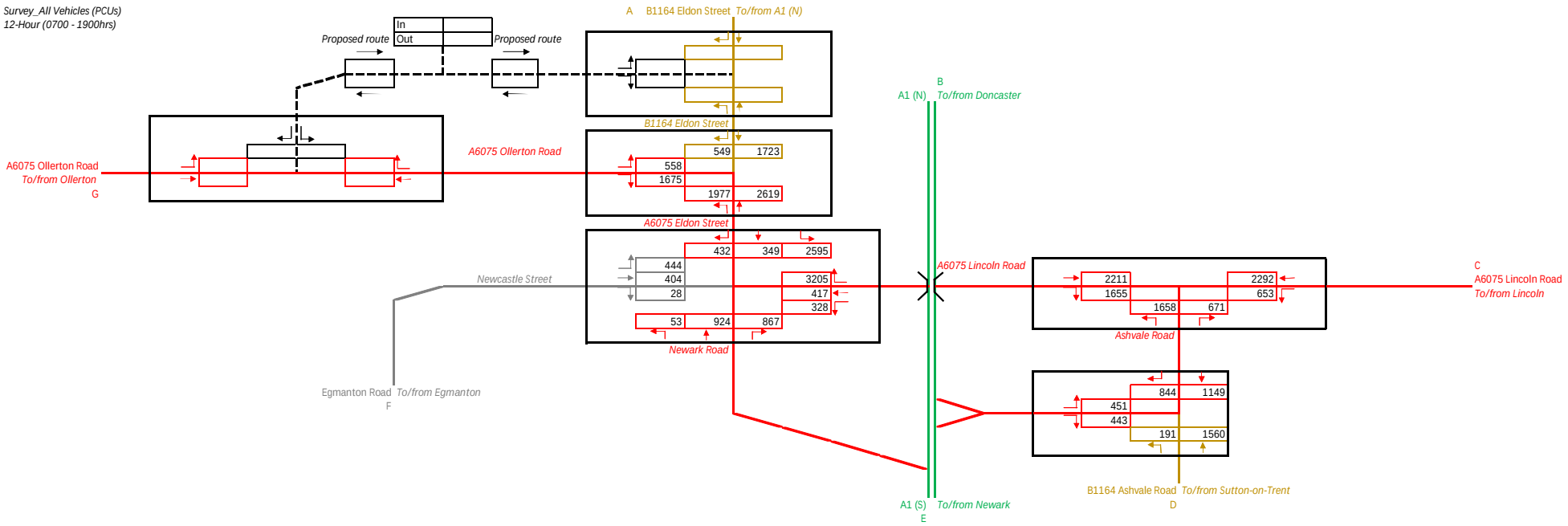
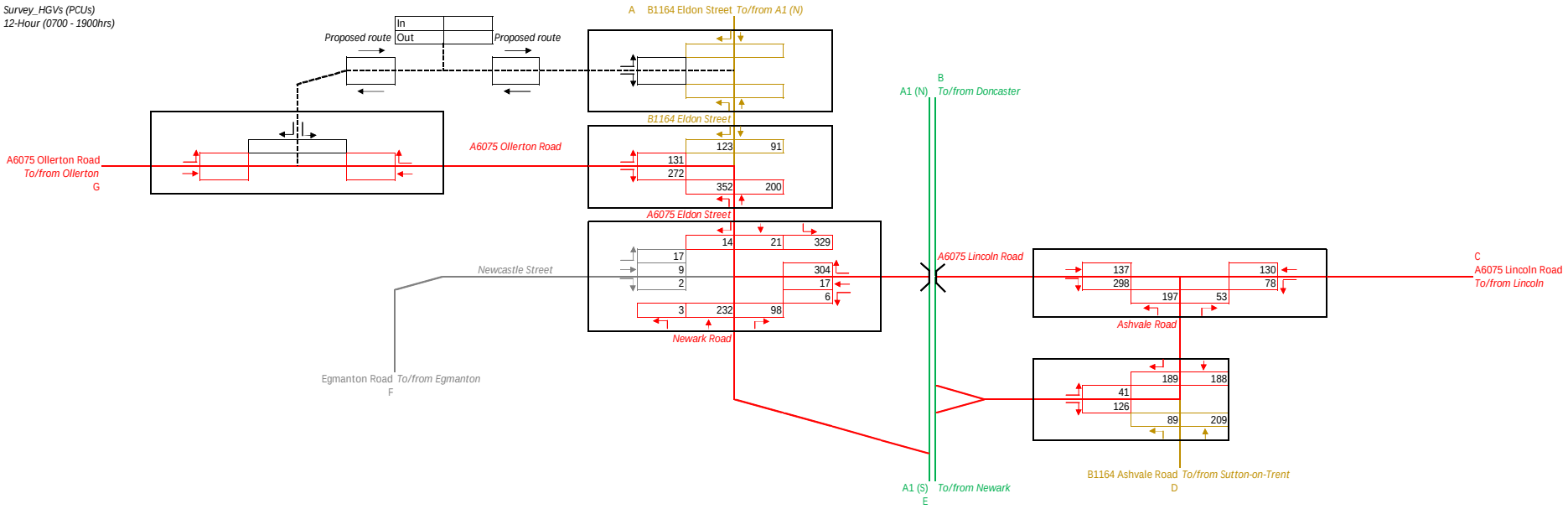
PM (1700 - 1800hrs)
In
Out
Proposed route
Proposed route
A
B1164 Eldon Street
To/from A1 (N)
B
A1 (N)
To/from Doncaster
B1164 Eldon Street
A6075 Ollerton Road
A6075 Ollerton Road
To/from Ollerton
G
16
7
0
8
23
16
A6075 Eldon Street
2
2
11
0
0
0
24
2
2
Newcastle Street
2
15
8
Newark Road
A6075 Lincoln Road
11
8
12
7
18
0
C
A6075 Lincoln Road
To/from Lincoln
Ashvale Road
5
9
7
7
2
11
Egmanton Road
To/from Egmanton
F
B1164 Ashvale Road
To/from Sutton-on-Trent
D
A1 (S)
To/from Newark
E


Survey_All Vehicles (PCUs)
12-Hour (0700 - 1900hrs)
In
Out
Proposed route
Proposed route
A B1164 Eldon Street To/from A1 (N)
B
A1 (N) To/from Doncaster
B1164 Eldon Street
A6075 Ollerton Road
A6075 Ollerton Road
To/from Ollerton
G
549
1723
558
1675
1977
2619
A6075 Eldon Street
432
349
2595
444
404
28
3205
417
328
53
924
867
Newcastle Street
Newark Road
A6075 Lincoln Road
2211
2292
1655
653
1658
671
C
A6075 Lincoln Road
To/from Lincoln
Ashvale Road
844
1149
451
443
191
1560
Egmanton Road To/from Egmanton
F
B1164 Ashvale Road To/from Sutton-on-Trent
D
A1 (S) To/from Newark
E


Survey_HGVs (PCUs)
12-Hour (0700 - 1900hrs)
In
Out
Proposed route
Proposed route
A
B1164 Eldon Street
To/from A1 (N)
B
A1 (N)
To/from Doncaster
B1164 Eldon Street
A6075 Ollerton Road
A6075 Ollerton Road
To/from Ollerton
G
123
91
131
272
352
200
A6075 Eldon Street
14
21
329
17
9
2
304
17
6
3
232
98
Newcastle Street
Newark Road
A6075 Lincoln Road
137
130
298
78
197
53
Ashvale Road
C
A6075 Lincoln Road
To/from Lincoln
189
188
41
126
89
209
Egmanton Road
To/from Egmanton
F
A1 (S)
To/from Newark
E
B1164 Ashvale Road
To/from Sutton-on-Trent
D

aecom.com

Appendix B – Cost Estimates

Code	Description	Unit	Quantity	Rate	Amount
	Tuxford - Northern Route connecting Ollerton road to the B1164. roundabouts at each end				
	Northen routes - 1297m				
	Urban Link Roads				
	Two lane link road (carriageway is 7.3m wide)	m	1297	£2,425.00	£3,145,225.00
	Ollerton Road Roundabout - **15.6m Centre Island, 24m ICD.** **Centre Island Area = 191m^2** **ICD Area = 452m^2** **Circulatory Area = (ICD Area - Centre Island Area) = (452m^2 - 191m^2) = 261.3m^2**				
	Urban Link Roads				
	Two lane link road (carriageway is 7.3m wide) 74.5m on the Eastern Arm Approach - A6075 Ollerton Road	m	74.5	£2,425.00	£180,662.50
	Two lane link road (carriageway is 7.3m wide) 38.2m on the Western Arm Approach - A6075 Ollerton Road	m	38.2	£2,425.00	£92,635.00
	Single Lane Link Road (carriageway is 7.3m wide) A61 Derby Road Roundabout - Length of Circulatory Carriageway (Midpoint to Midpoint) = 132m	m	132	£2,425.00	£320,100.00
	Footway construction (bit-mac plus edgings) A61 Derby Road Roundabout - Centre Island - 17m Radius, 908m^2 Area.	m^2	97	£97.00	£9,409.00
	B1164 Roundabout - **15.6m Centre Island, 24m ICD.** **Centre Island Area = 191m2** **ICD Area = 452m2** **Circulatory Area = (ICD Area - Centre Island Area) = (452m2 - 191m2) = 261.3m2**				
	Urban Link Roads				
	Two lane link road (carriageway is 7.3m wide) 91m on the NorthWest Arm Approach - B1164	m	91	£2,425.00	£220,675.00
	Two lane link road (carriageway is 7.3m wide) 39m on the SouthEast Arm Approach - B1164	m	39	£2,425.00	£94,575.00
	Single Lane Link Road (carriageway is 3.7m wide) Holmgate Road Roundabout - Length of Circulatory Carriageway (Midpoint to Midpoint) = 117m	m	117	£1,475.00	£172,575.00
	Footway construction (bit-mac plus edgings) Holmgate Road Roundabout - Centre Island - 15m Radius, 686m^2 Area.	m^2	109	£125.00	£13,625.00
	Bevercotes Lane East Staggered Junction with Tuxford Northern Route				
	Rural Link Road single carriageway 3.7m wide	m	119	£1,350.00	£160,650.00
	Bevercotes Lane West Staggered Junction with Tuxford Northern Route				
	Rural Link Road single carriageway 3.7m wide	m	153	£1,350.00	£206,550.00
	Footpaths and Crossings				
	Footway construction (bit-mac plus edgings) 3m footway on either side of the new road for the Northern route = (1200 * 2) * 3 = 7200m^2	m^2	7200	£125.00	£900,000.00
	Footway construction (bit-mac plus edgings) 3m footway on one side and shared route on Roundabout tieing into existing paths on Ollerton Road = 83 * 2 * 3 = 498	m^2	498	£125.00	£62,250.00
	Footway construction (bit-mac plus edgings) 3m footway on one side and shared route on Roundabout tieing into existing paths on B1164 = (134 * 3)+(54*3)+(63.5*3) = 754.5	m^2	754.5	£125.00	£94,312.50
	Culverts				
	Precast concrete cuverts, cattle creeps and subway units; rebated joints Rectangular cross section - 1500mm high x 1500mm wide	m	1	1102.48	£1,102.48
	Earthworks **Roadway Excavation** - 51188.52m^3 (total roadway excavation excluding topsoil = 51188.52 - 10237.704 = **40950.82** 80% of this assumed to be acceptable, 20% assumed to be unacceptable (80% U1A, 15% U1B, 5% U2)). **Acceptable Roadway Excavation excluding Topsoil** = 80% of 40950.82 = **32760.66** **Unacceptable Roadway Excavation =** 20% of 40950.82 = **8190.16** **Fill** - 33391.25m^3 **Disturbed Area** - **96685.49m^2** **Topsoil value** = 150mm x 80% of disturbed area = **1933.71m^2**			8190.16	
	Excavation of acceptable material Class 5A	m^3	10237.7	2.51	£25,696.64
	Excavation of acceptable material excluding Class 5A in cutting and other excavation	m^3	32760.66	5.74	£188,046.19
	Deposition of acceptable material Class 1C/6B in embankments and other areas of fill	m^3	32760.66	2.11	£69,124.99
	Disposal of unacceptable material Class U1 using 10 tonnes capacity tipping lorry for on-site or off-site use; haul distance to tip not exceeding 1km ADD per further km haul Total value on unacceptable material Class U1 = (80% = U1, 15% = U1B) Total = 95% of = 8190.16 = 7780.65	m^3	7781	7.27	£56,567.87
	Disposal of unacceptable material Class U2 using 10 tonnes capacity tipping lorry for on-site or off-site use; haul distance to tip not exceeding 1km ADD per further km haul Total value on unacceptable material Class U2 = (5% = U2) Total = 5% of = 8190.16 = 409.51	m^3	409.5	7.27	£2,977.07
	Extra/over disposal of U2 hazardous waste	m^3	409.5	131.76	£53,955.72
	Extra/over other taxable waste material - U1 Density of material assumed to be 2000kg/m^3	Tonne	15561.3	3.34	£51,974.74
	Extra/over other taxable waste material - U2 Density of material assumed to be 2000kg/m3	Tonne	819.02	104.79	£85,825.11
	Imported graded granular fill, natural gravels DfT Class 1 A/B/C [1.9 t/m^3] Imported acceptable material in embankments and other areas of fill Total value of imported material = Fill - Deposition of acceptable material Class 1C/6B in embankments and other areas of fill = 33391.25 - 32760.66 = 630.59	m^3	630.6	41.40	£26,106.84
	Contingency			10%	£623,462.16
	Sub-Total Construction				**£6,858,083.80**
	Preliminaries (20% of Construction)			20%	£1,371,616.76
	Sub-Total Construction				£8,229,700.57
	Investment Cost Optimism Bias			46%	£3,785,662.26
	Total Carried to Collection Page				**£12,015,362.83**