Chipping Norton - HGV and Air Quality Mitigation Assessment

Study Report

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Oxfordshire County Council
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1.0 Introduction

1.1 Preamble

1.1.1 Chipping Norton is a historic market town within West Oxfordshire. It is situated on the eastern edge of the Cotswolds Area of Outstanding Natural Beauty (AONB) which also covers much of the town itself. Chipping Norton is dissected by the A44 and A361 which are heavily used lorry routes passing through the town centre.

1.1.2 Due to the large number of HGV movements in the town centre, there have been issues surrounding the safety of pedestrians, space for vehicles to safely pass each other in Horsefair, and a rise in nitrogen dioxide air pollution resulting in an Air Quality Management Area being declared in 2005 and a subsequent Air Quality Action Plan approved in 2008.

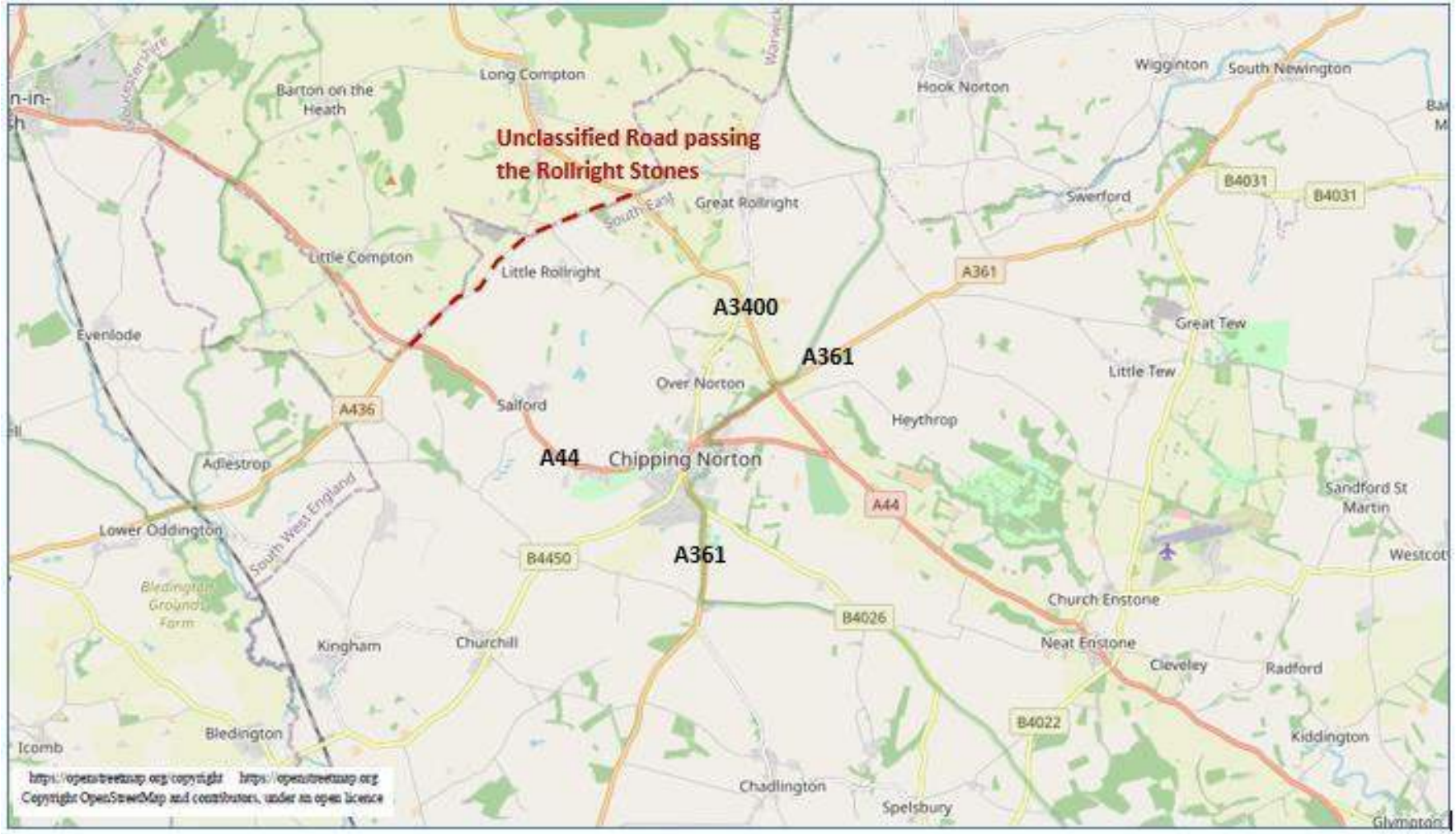
1.1.3 A number of traffic management measures were put forward and assessed as part of the Air Quality Action Plan, which ranged in scale from the re-routing of HGV traffic via reclassification of the A44 through the centre of the town, to the consideration of routes which fully bypass Chipping Norton.

1.1.4 Further reference to addressing issues of poor air quality was made within the September 2018 'West Oxfordshire Local Plan 2031' and the December 2015 'Chipping Norton Neighbourhood Plan'.

1.1.5 The aim of this study is to revisit and update the assumptions made with regards to the various scheme options available, to carry out a comparative assessment of the potential impacts of different options upon HGV levels within Chipping Norton, and to assess the resultant effect upon Air Quality. The study also considers the wider implications of these changes, with details of the traffic scenarios assessed provided in **Section 2.0**, whilst the assessment criteria applied is summarised in **Section 4.0** of this report.

1.1.6 A plan providing an overview of the project area is provided on the following page as **Figure 1-1**.

Figure 1-1 – Project study area



1.1.7 The main options (and sub-options) appraised within this report are detailed below:

- Option 1: Re-routing HGVs along the unclassified road adjacent to the Rollright Stones;
- Option 2: Re-routing HGVs along the unclassified road adjacent to the Rollright Stones and realigning to the south of the Rollright Stones;
- Option 3: Re-routing HGVs along the unclassified road adjacent to the Rollright Stones and realigning to the north of the Rollright Stones;
- Option 4: The delivery of the Eastern Development Link Road as part of the Tank Farm development;
- Option 5: Reclassification of the A44, with a weight restriction through Chipping Norton town centre;
- Option 6: Weight restriction on the A361 Banbury Road; and
- Option 7: Weight restriction on the A361 Banbury Road and A3400.

1.1.8 One alternate option was also considered, in which a weight restriction is applied to the unclassified road passing the Rollright Stones (Option 8).

1.1.9 Whilst Options 1-4 provide alternative routing options for HGV traffic, Options 5-8 are based upon the imposition of traffic orders limiting access for heavy vehicles. As such Options 5-8 may also form part of packages of works supporting those options which provide physical infrastructure.

2.0 Traffic Scenarios

2.1.1 In order to assess the potential effects of each option, the following approach to predicting changes in traffic arising from each option was applied:

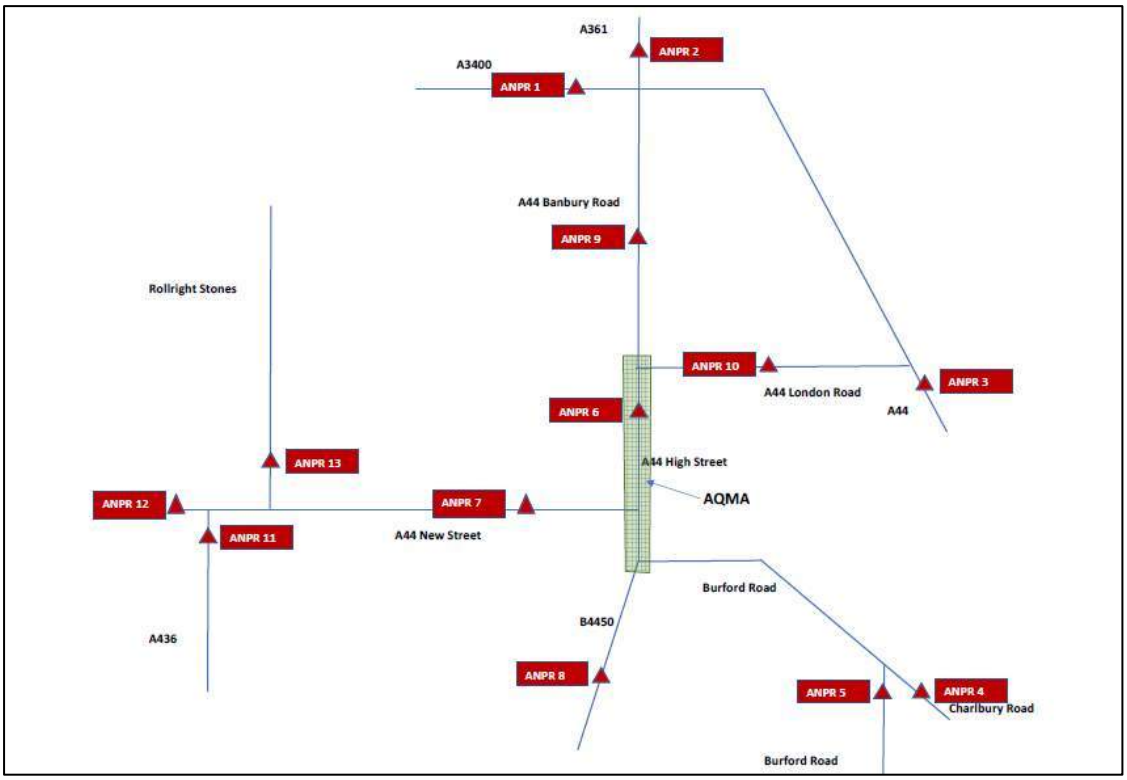
- The number of HGV journeys which could potentially reroute as a result of each proposed scheme option was estimated.
- The number of HGVs which have a trip purpose within Chipping Norton was estimated. This would, for example, relate to HGVs carrying out deliveries or servicing for the retail within the centre, and which therefore wouldn't be influenced by the availability of alternative options or amenity weight restrictions.

2.1.2 These two factors, when considered together, were considered as providing a reasonable basis for estimating the total number of daily HGV trips which could potentially re-route as a result of scheme options.

2.1.3 In order to estimate the number of HGV movements with the potential to be influenced by each scheme option, ANPR (Automatic Number Plate Recognition) data gather during October 2019[1] was used to generate a matrix of movements between count sites, based upon anonymised data. The overall matrix of Vehicle Movements is provided as **Appendix A** and the matrix of HGV movements is provided as **Appendix B**, whilst **Figure 2-1** (following page) provides details of the ANPR survey network.

[1] It should be noted that since the date of the ANPR surveys, a Weight Restriction has been imposed within Burford on the A361 south of the study area. Whilst the effects of this restriction have not yet been fully assessed, this may result in some rerouting of HGV traffic to the south of the town.

Figure 2-1 - ANPR Survey Network



2.1.4 This information was then used to determine the number of end-to-end trips which could potentially reroute as a result of introducing individual scheme options.

2.1.5 For example HGV movements first captured at count sites on the A436 and the A44 to the west of Chipping Norton and last captured at count sites on the A361 and A44 to the north and east of the town, were considered to have the potential to re-route via the unclassified road passing the Rollright Stones, whereas HGVs first captured at sites on the Burford Road and Charlbury Road were considered unlikely to use this route, with these trips more likely to use the Eastern Development Link Road.

2.1.6 In order to identify the proportion of trips likely to have a trip purpose within Chipping Norton a further matrix of typical site to site journey times for all movements which pass through the centre of the town was produced, and used as a benchmark against which the journey times recorded in the ANPR could be assessed. An additional 5 minutes was added to each typical average journey time as a buffer to account for variation in traffic conditions.

2.1.7 The assessment work then identified the proportion of each set of trips which fell within this journey time (and was therefore assumed to be through traffic, as the journey time was sufficiently short to suggest that no stops had taken place), and the proportion which exceeded this journey time (and which is therefore assumed to be stopping within Chipping Norton, i.e. having a trip purpose such as deliveries).

2.1.8 The proportion of trips considered to be through traffic was then applied to the total number of HGV trips on each route, to provide an estimate of the number of HGV movements that would have the potential to re-route as a result of introducing each scheme option.

2.1.9 As an example, there was a recorded average of four daily HGV movements first recorded at count site 7 (A44 New Street) and terminating past count site 2 (A361 Banbury Road), with 53% of movements between these two locations identified as being through movements. Therefore, two of these movements (4 * 53%) were considered as having the potential to re-route if a suitable alternative was available, with the remaining two assumed to continue to use the A44 through the town centre.

2.1.10 The same calculation was applied to each pair of movements between count locations to give a total number of potential trips which could reroute. The summary calculations for each scheme option are provided in **Appendix C**.

2.1.11 Whilst the majority of the scheme options considered relate to reductions in HGV traffic, the provision of the Eastern Relief Road was also predicted as resulting in a 7% reduction in car traffic, (based upon the findings of the 2017 Chipping Norton Transport Options Study Addendum). As such this was also taken into account when considering the future effects upon Air Quality.

2.1.12 The resulting predicted changes to traffic flows on Chipping Norton High Street are summarised in **Table 2-1** (below)[2].

Table 2-1 – Total Daily Traffic flows through Chipping Norton High Street

High Street Flows	Car		HGV		Summary	
	North	South	North	South	2 Way	Change
2031 Base	5537	7689	270	276	546	0
Rollright Stones Options (Options 1-3)	5537	7689	164	167	331	-215
Eastern Relief Road (Option 4)	5149	7151	206	228	435	-111
A361 Weight Limit (Option 6)	5537	7689	220	199	420	-126
A361 & A3400 Weight Limit (Option 7)	5537	7689	213	185	398	-148
Rollright Stones Weight Limit (Option 8)	5537	7689	290	302	592	+45
Eastern Relief Road + RRS	5149	7151	100	119	220	-326

[2] Option 5 (the de-classification of the A44) has not been included as this scheme option could not be delivered in isolation.

3.0 Summary of impacts

3.1 Introduction

3.1.1 The following section of this report summarises the main predicted effects of each scheme option on traffic flows, resulting from the introduction of Options 1 – 8, as identified in **Section 1.1.7** and the resulting forecast changes in traffic summarised in **Section 2.0.**

3.2 Option 1

3.2.1 Option 1, which involves the upgrading of the unclassified road passing the Rollright Stones, was predicted to have to potential to remove the largest number of HGV movements from the A44 through the centre of Chipping Norton, estimated as being in the order of 215 daily HGV movements (two way).

3.2.2 The predominant HGV movements this route was predicted to serve would be east-west movements along the A44, which would be displaced to use the A3400 and the improved route passing the Rollright Stones (making up 150 of the total of 215 movements potentially effected).

3.2.3 It was also noted that the assessment work identified that these movements had a lower than average proportion of trips stopping within the town, which would be consistent with the longer distance and more strategic nature of these journeys.

3.3 Option 2

3.3.1 The traffic impacts of Option 2, which provides a short section of new carriageway to bypass the Rollright Stones to the south, was predicted to have the same overall effects on HGV movements as Option 1. the difference between the schemes are expected to be marginal in terms of strategic routing, with the additional construction being largely based upon offsetting heritage and environmental effects at a local level.

3.4 Option 3

3.4.1 The traffic impacts of Option 3, which provides a short section of new carriageway to bypass the Rollright Stones to the north, was also predicted to have the same overall effects on HGV movements as Option 1. As with Option 2, the difference between the schemes are expected to be marginal in terms of strategic routing, with the additional construction being largely based upon offsetting heritage and environmental effects at a local level.

3.5 Option 4

3.5.1 The traffic impacts of Option 4, which provides a new route to the east of Chipping Norton as part of the Tank Farm development area, were predicted to predominantly impact on HGV movements running north-south on the A361, bypassing the town centre. This scheme option was predicted to have the potential to remove approximately 111 HGV movements from the centre of Chipping Norton.

3.6 Option 5

3.6.1 Option 5, the reclassification (and downgrading) of the current A44 through the centre of Chipping Norton, with the introduction of an associated weight restriction, is not expected to result in any changes to HGV movements in isolation, as this option is reliant upon the prior identification or delivery of suitable alternative routes. However, should an appropriate alternate route be identified this would remove the majority of HGV traffic from the centre of the town, with approximately 70% of HGV traffic being through movements. This could potentially result in the removal of approximately 370 daily HGV movements from the town.

3.7 Option 6

3.7.1 The imposition of a weight limit on the A361, to the north of the town, could affect approximately 126 daily HGV movements (this being the total number of HGVs identified in the ANPR survey as having either a trip origin or destination on this route). However, without the identification and provision of a suitable alternative route for these movements, there is the potential for them to be displaced onto less appropriate routes or use local roads passing through villages to the north-east of Chipping Norton. Longer distance alternatives could involve a greater use of the A429 and A422 to the west, but this would result in a sizeable diversion and would have to be agreed with the relevant adjacent authorities.

3.8 Option 7

3.8.1 As with Option 6, the imposition of a weight limit on the A361 in combination with a weight restriction on the A4300 has the potential to remove trips from the town centre, but only if delivered in combination with measures to provide a suitable alternative route. Due to weight restrictions understood to already be in place on the A4300 further to the west, the main use of the A3400 immediate to Chipping Norton is as part of the informal bypass route to the town this forms along with the unclassified road passing the Rollright Stones.

3.8.2 As such the imposition of a weight limit on the A3400 may have the effect of removing the existing HGV traffic from the unclassified road passing the Rollright Stones and displacing it onto the A44 through Chipping Norton.

3.8.3 The wider effects of this option are otherwise consistent with that of Option 6, resulting in the potential wider displacement of traffic, predominantly to the north-west of the town.

3.9 Option 8

3.9.1 This sensitivity test was based upon the imposition of a weight restriction on the unclassified road passing the Rollright Stones, which was identified during the ANPR surveys as already carrying some HGV traffic.

3.9.2 Working on the assumption that the HGVs currently using this route to travel from the A44 (west of Chipping Norton) to destinations to the north and east of the town, would then route via the A44 through the centre of the town to reach the same destinations, this option would result in a slight overall increase in town centre HGV traffic.

4.0 Option Appraisal

4.1 Introduction

4.1.1 In order to meet the requirements of the project brief, as outlined in **Section 1.0**, the following appraisal criteria have been applied to inform a summary Red / Amber / Green comparative assessment for each option:

4.1.2 **Policy Fit**: Based upon the review of the policy aims and objectives relevant to the appraisal, in order to determine the degree to which the potential options align with these policy goals.

4.1.3 **Connectivity**: Based upon a qualitative review of predicted changes in traffic flows and composition, both within Chipping Norton and on the identified alternative route/s. To provide a consistent assessment framework, reference has been made to the criteria within the EIMA guidelines on 'the Environmental Assessment of Road Traffic'.

4.1.4 **Reliability**: Based upon a qualitative review of predicted changes in traffic flows and composition, through junctions identified as congested in previous study work.

4.1.5 **Deliverability**: Based upon the requirement for additional works either within, or outside of, the existing public highway.

4.1.6 **Cross boundary matters**: Based upon the requirement for works outside the County Boundary, for example any works which would require works within Warwickshire.

4.1.7 **Air quality**: Based upon the findings of the Air Quality Technical Note provided as **Appendix D** of this report.

4.1.8 **Heritage**: Based upon the initial findings and recommendations of the *'Chipping Norton HGV Route: Archaeological and Heritage Appraisal'*, provided as **Appendix E** of this report.

4.1.9 **Potential cost**: Whilst no detailed costing work has been carried out, reference has been made, where possible, to previous costing work referenced in the 2008 Air Quality Action Plan and the subsequent 2016/2017 Chipping Norton Options Study work.

4.1.10 Further detail on each stage of the work undertaken is provided in the following sections of this report.

4.2 Methodology

4.2.1 The following chapter of this report provides details of the appraisal methodology applied and the resulting comparative assessment for each scheme option.

4.2.2 The assessment was informed by a combination of the quantitative traffic flow data for each scenario (as outlined in **Section 2.0** and summarised in **Table 2-1**), and the qualitative information summarised under each heading (below).

4.3 Policy Fit

4.3.1 In order to determine the degree to which individual scheme options could support local policy objectives, a review of relevant policy was carried out. The main policy areas identified are summarised below.

Connecting Oxfordshire

4.3.2 Connecting Oxfordshire (Local Transport Plan) includes several policies which have relevance to the Chipping Norton study.

4.3.3 When considering the role and function of routes within the County, Policy 04 states that:

Oxfordshire County Council will prioritise the needs of different types of users in developing transport schemes or considering development proposals, taking into account road classification and function/purpose, the characteristics and function of the place and the need to make efficient use of transport network capacity.

4.3.4 The current functions of major routes within the County are defined in Table 2 of the document, in which the A44 (north of the A4095) is currently classed as Class 2b 'Other Primary Route'. This is defined as a road suitable for longer distance and inter-regional traffic. Main connections between defined primary destinations. May be part of the national lorry network. Able to cater for high volumes of traffic. Either dual or single carriageway. No restrictions on access or permanent weight restrictions, may be some height restrictions.

4.3.5 As such, in the event that the role of the A44 through Chipping Norton is revised, there would be a need to reclassify the route to a lower classification, reducing its role in terms of serving high volumes of longer distance traffic (including HGV traffic).

4.3.6 When considering the specific issue of air quality, Policy 29 states that:

Oxfordshire County Council will work with district and city councils to develop and implement affordable transport interventions to support Air Quality Action Plans, giving priority to measures which also contribute to other transport objectives.

4.3.7 This is reflected in the wording contained within the supporting Freight Strategy document, which states that:

In the case of Chipping Norton, a scheme to change the status of the A44 would be required before a new environmental weight limit could be considered. In line with policies 4 and 29 of the Local Transport Plan, taking note of Table 2 of the LTP, we will seek to remove the primary route status on the A44 between Oxford and Moreton-in Marsh. This would open opportunities to reduce HGV movements through Chipping Norton and address the air quality problems. However, as with weight limits, this would need to be funded through development and/or the local community, businesses and the town council.

West Oxfordshire Local Plan

4.3.8 This document sets out the spatial vision for the district for the period to 2031 and includes specific reference to issues of congestion and air quality within Chipping Norton. Reference is also made to the provision of an 'Eastern Link Road' as part of the supporting infrastructure for a major residential allocation to the east of the town.

4.3.9 Policy CN1: East Chipping Norton strategic development area (1,200 homes) states that land to the east of Chipping Norton is planned to:

'accommodate a sustainable, integrated community that forms a positive addition to the town, including:

- *The provision of supporting transport infrastructure, including mitigating the impact of traffic associated with the development…. To include the provision of an eastern link road connecting the Banbury Road to the B4026/A361 via London Road. This will be provided as an integral part of the proposed SDA.*

We will therefore work in partnership with the County Council, Chipping Norton Town Council and other relevant parties to bring forward the East Chipping Norton SDA including the provision of the eastern link road and also to implement other necessary improvements to alleviate the impact of HGVs on the Town Centre'.

4.3.10 Policy CN2: Chipping Norton Sub-Area Strategy, states that:

Proposals for development in the sub area should be consistent with the strategy, which includes:

Working with the Highway Authority, the Town Council, and other partners to reduce the impact of through traffic, especially lorries, upon the town centre and its air quality. This will include the provision of the new eastern link road to be delivered as an integral part of the East Chipping Norton Strategic Development Area.

4.3.11 The document also includes a number of policies which relate to the protection of the environmental and heritage assets of the area.

4.3.12 Policy EH2: Landscape Character, states that:

4.3.13 *Proposals which would result in the loss of features, important for their visual, amenity, or historic value will not be permitted unless the loss can be justified by appropriate mitigation and/or compensatory measures which can be secured to the satisfaction of the Council.*

4.3.14 *Proposed development should avoid causing pollution, especially noise and light, which has an adverse impact upon landscape character and should incorporate measures to maintain or improve the existing level of tranquillity and dark-sky quality, reversing existing pollution where possible.*

4.3.15 Policy EH8: Environmental Protection includes specific reference to issues of air quality,

4.3.16 *Air Quality*

4.3.17 *The Air quality within West Oxfordshire will be managed and improved in line with National Air Quality standards, the principles of best practice and the Air Quality Management Area Action Plans for Witney and Chipping Norton.*

4.3.18 While Policy EH9 – Historic Environment states that:

4.3.19 *Proposals which would harm the significance of a designated asset will not be approved, unless there is a clear and convincing justification in the form of substantive tangible public benefits that clearly and convincingly outweigh the harm, using the balancing principles set out in national policy and guidance.*

Chipping Norton Neighbourhood Plan

4.3.20 The Chipping Norton Neighbourhood Plan includes two policies which relate the assessment of the scheme options being considered.

4.3.21 Policy TM1: Traffic and HGVs, states that:

Design and highways proposals that mitigate the impact of through traffic within Chipping Norton, particularly from heavy goods vehicles, are strongly encouraged.

4.3.22 Whilst Policy BD1: Historic built environment states that:

The parish's designated heritage assets and their settings including listed buildings, the Conservation Area, scheduled monuments and assets above and below ground, will be preserved or enhanced. Proposals for development will take into account their significance and contribution to local distinctiveness, character and sense of place. Proposals for development that affect non-designated historic assets will be considered taking account of the scale of any harm or loss and the significance of the heritage asset as set out in the National Planning Policy Framework (NPPF 2012).

Summary

4.3.23 From a review of the policy objectives contained within Plan documents at a Parish, District, and County level there is a consistent position expressed with regards to reducing HGV traffic through Chipping Norton, with the related benefits to air quality.

4.3.24 This is balanced by a need to protect the environmental, landscape, and heritage assets of the area, which would relate to both the urban environment within Chipping Norton and the rural setting of the unclassified road passing the Rollright Stones Scheduled Ancient Monument.

4.3.25 As such when considering each scheme options in terms of support for local policy objectives, the following criteria were applied:

- Impact of the scheme option upon air quality within Chipping Norton *(supporting LTP Policy 29, Local Plan Policies CN2 and EH8, and Neighbourhood Plan Policy TM1).*
- Impact of the scheme upon the built environment within Chipping Norton *(supporting Neighbourhood Plan Policy BD1).*
- Impact of the scheme option upon the heritage assets outside of the Centre of Chipping Norton, with particular consideration of the impact upon the Rollright Stones SAM

(Scheduled Ancient Monument) *(supporting Local Plan Policies EH2 and EH9, and Neighbourhood Plan Policy BD1).*

4.4 Option Appraisal: Policy Fit

4.4.1 The review of each scheme option against these policy aims is summarised below. Those options which promoted the use of the unclassified road passing the Rollright Stones (Options 1,2 and 3) scored positively with regards to the policy aims of improving air quality within Chipping Norton, and the protection of the historic urban nature of the town, due to the removal of HGV traffic from the town centre. However, these options scored poorly with regards to their impact upon the wider heritage assets around the town, in particular upon the Rollright Stones, with the route directly passing the stones scoring the most poorly.

4.4.2 Conversely the sensitivity test in which a weight restriction was imposed upon the Rollright Stones route scored positively with regards to wider heritage assets, and negatively when considering the policy aims related to the protection of the town centre, due to the potential increase in trips through the town.

4.4.3 The eastern relief road scored positively with regards to policy aims protecting the town centre, due to the reduction in trips through the town centre, with a neutral score on wider heritage impacts.

4.4.4 The scheme options associated with changes in classification or the introduction of weight restrictions scored positively with regards to the impacts on the town centre, due to the predicted reduction in town centre trips, however these were largely dependent upon the identification and provision of an alternative, appropriate route. As such none of these schemes would provide the benefits identified in isolation.

4.4.5 A summary of the scheme option policy review is provided in **Table 4-1** (following page).

Table 4-1 – Appraisal Summary: Policy Fit

Option	Scheme Details	Policy Area		
		Impact on Air Quality	Impact on historic built environment	Impact on wider heritage assets
1	Re-routing via Rollright Stones unclassified road	✓	✓	××
2	Re-routing south of Rollright Stones	✓	✓	×
3	Re-routing north of Rollright Stones	✓	✓	×
4	Re-routing via eastern development link	✓	✓	±
5	Reclassification of A44[3]	✓	✓	±
6	Weight restriction on A361	✓	✓	±
7	Weight restriction on A361 and A3400	✓	✓	±
8	Weight restriction on Rollright Stones unclassified road	×	×	✓

[3] Only if delivered in combination with other options

4.5 Connectivity

4.5.1 The effect of scheme options upon connectivity was appraised on the basis of the impact each option would have upon pedestrian and cycle movements, whether due to an increase or decrease in traffic on the effected route/s.

4.5.2 The IEMA document 'Guidelines for the Environmental Assessment of Road Traffic' provides a framework for the assessment of wider environmental impacts of traffic, including the effects upon pedestrians. The general guidance contained within that document was used as the basis for assessing issues of connectivity.

4.5.3 When considering pedestrian movements, the main impacts of changing the status and potential usage of a road are split between 'Severance' and 'Pedestrian Amenity', with Severance defining the degree to which traffic levels may increase or decrease the difficulty pedestrians experience in crossing a road, whilst Pedestrian Amenity takes into account the relative 'pleasantness' of a journey and the level of intimidation a pedestrian may feel due to traffic.

4.5.4 When considering Severance, the IEMA guidelines suggest that changes in traffic flow in the order of 30%, 60% and 90% would equate to slight, moderate and substantial severance impacts.

4.5.5 Based upon these criteria, whilst the scheme options in question will result in the removal of a proportion of HGV traffic, or in the case of the Eastern Development Link Road, some car traffic, none of the scheme would result in reductions in flow exceeding 30%, and therefore would not be considered to have a significant effect upon Severance levels.

4.5.6 When considering pedestrian delay the guidance sets out a lower threshold of 10 seconds delay and an upper threshold of 40 seconds, which for a link with no crossing facilities equates to a two-way flow of about 1,400 vehicles per hour.

4.5.7 The ATC (Automatic Traffic Count) data collected for the project recorded average weekday peak hour flows of 1,081 (two-way) in the AM peak and 1,039 (two way) in the PM peak hour. As such, the levels of recorded traffic would not reach the thresholds for pedestrian delay exceeding 10 seconds.

4.5.8 When assessing pedestrian amenity, the guidance document provides a broad 'rule of thumb' that there is a perceptible change in pedestrian amenity when traffic flows (or its HGV component) either halve or double. Whilst none of the scheme options are predicted to result in halving or doubling of overall traffic levels, there is scope for a significant change in HGV composition. As such the impact upon pedestrian amenity has been taken into account within the appraisal process.

4.5.9 The final connectivity criteria considered within the appraisal process was the effect upon pedestrian fear and intimidation, with the IEMA guidance noting that the impact of this is dependent upon the volume of traffic, its HGV composition, its proximity to people, or the lack of protection caused by such factors as narrow pavement widths.

4.5.10 This is relevant to the northern end of the High Street, from the junction with Goddards Lane onwards, where footway widths narrow significantly, bringing traffic closer to pedestrian, in a section where the available carriageway also narrows.

4.5.11 Whilst the guidance document does not provide specific thresholds, it does provide some suggested measurement criteria, with Average Hourly Traffic Flows over an 18-hour period as the basis for assessment.

- Extreme – 1800 two-way movements per hour
- Great – 1200 – 1800 two-way movements per hour
- Moderate – 600 – 1200 two-way movements per hour

4.5.12 The ATC survey data collected for the project recorded an average hourly two-way flow on the High Street of 706 vehicles, i.e. at the lower end of the moderate banding for pedestrian fear and intimidation. Whilst none of the schemes in question are expected to reduce the average hourly two way flows below 600 trips, reducing the number of vehicles passing the narrowed section of the High Street, particularly HGV traffic would be considered to have a positive impact in terms of fear and intimidation.

4.5.13 A further metric given is the speed of traffic on a link, with the following broad criteria suggested.

4.5.14 Average speed recorded over an 18-hour day. Measured in Mph (miles per hour):

- Extreme – 20mph +
- Great – 15-20mph
- Moderate – 10-15mph

4.5.15 The ATC surveys recorded average weekday 85th percentile speeds of approximately 24mph in each direction. As such the speeds of traffic on the High Street would be sufficiently high to class as 'Extreme' in terms of pedestrian fear and intimidation.

4.5.16 Whilst the expected effects of scheme options are predominantly related to changes in pedestrian connectivity within the centre of Chipping Norton, the unclassified road passing the Rollright Stones is crossed by existing Public Rights of Way (PROW) routes, and as such there is the potential for an increase in traffic on this route to impact upon these pedestrian routes.

4.5.17 As outlined above, none of the schemes options were predicted to result in changes in flow significant enough to change severance effects or pedestrian delay, with all scheme options receiving a neutral score.

4.5.18 In general, all the scheme options which remove traffic from the centre of Chipping Norton scored positively with regards to improving pedestrian amenity. The options associated with the imposition of Weight Restrictions on the A361 and A3400 were give a neutral score, as there is the potential for displaced HGV traffic to impact on pedestrian amenity on any alternate routes.

4.5.19 Similarly, scheme options which removed traffic from the centre of Chipping Norton scored positively with regards to pedestrian fear and intimidation, predominantly associated with reductions in HGV movements through the narrower sections of highway at Horsefair.

4.5.20 A summary of the appraisal of scheme options against Connectivity criteria is provided as **Table 4-2** (following page).

Table 4-2 - Appraisal Summary: Connectivity

Option	Scheme Details	Connectivity Criteria			
		Severance	Pedestrian Delay	Pedestrian amenity	Pedestrian fear and intimidation
1	Re-routing via Rollright Stones unclassified road	±	±	✓	✓
2	Re-routing south of Rollright Stones	±	±	✓	✓
3	Re-routing north of Rollright Stones	±	±	✓	✓
4	Re-routing via eastern development link	±	±	✓	✓
5	Reclassification of A44	±	±	✓	✓
6	Weight restriction on A361	±	±	±	✓
7	Weight restriction on A361 and A3400	±	±	±	✓
8	Weight restriction on Rollright Stones unclassified road	±	±	±	×

4.6 Reliability

4.6.1 The 2016 Chipping Norton Transport Study included the assessment of key junctions within the town, based upon expected levels of traffic growth to 2031. This identified the likelihood that increased levels of congestion and delay would be experienced at the following junctions on the town centre corridor:

- The double mini roundabout, at the junction of the A44 London Road / Horsefair / A361 Banbury Road / Over Norton Road.
- The priority junction of the A44 New Street / A361 West End.

4.6.2 The appraisal criteria applied therefore included an assessment of the potential changes in flow through each of these junctions as a result of the scheme options considered, with reductions in flow being classed as beneficial.

4.6.3 In all cases (other than the sensitivity test in which a weight restriction is placed upon the Rollright Stones route), the scheme options scored positively, due to the removal of traffic from congested junctions within Chipping Norton. The greatest levels of predicted reduction in HGV traffic were associated with the introduction of one of the three options utilising the Rollright Stones route, although when spread across the course of a full day, these reductions are unlikely to have a significant impact upon individual junction operation.

4.6.4 When taking car traffic into account, the Eastern Development Link Road is likely to remove the highest number of trips overall from the congested junctions within Chipping Norton, with a predicted decrease in car traffic of 7%[4] in addition to the reduction in daily HGV movements.

4.6.5 When considering the operation of the southern junction (A44 New Street / West End), the Eastern Development Link Road is also predicted to remove trips from the most heavily congested movement on the junction, i.e. the right turn from West End onto the A44 northbound. As such the Eastern Development Link Road is considered to offer the greatest overall benefits in terms of improving journey reliability.

4.6.6 A summary of the reliability appraisal is provided as **Table 4-3** (following page).

[4] Based upon the findings of the 2017 Chipping Norton Transport Options Addendum Report

Table 4-3 - Appraisal Summary: Reliability

Option	Scheme Details	Reliability Criteria	
		Change in flow at New Street / West End Junction	Change in flow at London Road / Banbury Road / Horsefair / Over Norton Road junction
1	Re-routing via Rollright Stones unclassified road	-215	-215
2	Re-routing south of Rollright Stones	-215	-215
3	Re-routing north of Rollright Stones	-215	-215
4	Re-routing via eastern development link	-111 (HGV) -926 (Cars)	-111 (HGV) -926 (Cars)
5	Reclassification of A44	N/A	N/A
6	Weight restriction on A361	-126	-126
7	Weight restriction on A361 and A3400	-148	-148
8	Weight restriction on Rollright Stones unclassified road	+45	+45

4.7 Deliverability

4.7.1 The assessment of scheme option deliverability was based upon the need for third party land (i.e. land outside of the existing public highway). Other factors will also influence deliverability, including cost, the need for cross boundary agreements, and constraints such as impact upon heritage assets, however these are covered under separate appraisal headings within this report.

4.7.2 For the options which would promote the use of the currently unclassified route passing the Rollright Stones for HGV traffic (Options 1, 2 and 3), it has been assumed that the road would require improving to a standard suitable to accommodate greater levels of strategic traffic, and allow for the related reclassification of the A44 through the centre of Chipping Norton.

4.7.3 For the improved route to be in accordance with the design criteria set down in TD 27/05, Road Geometry Links: Cross Sections and Headroom, a typical cross section would allow for a 7.3m width carriageway with 2 x 1.0m hard strips, i.e. an overall corridor width of 9.3m excluding any verge areas and boundary treatments.

4.7.4 Whilst much of the corridor width between the junction with the A44 (to the south) and the A3400 (to the north) would appear to allow for this level of widening, there are several initial pinch-points where the extent of public highway narrows and where third party land may be required. The associated plan extracts are provided as **Appendix F**.

- The first pinch-point is located approximately 200m to the north of the junction with the A44 as the road passes a wooded area, with the highway corridor narrowing to approximately 8.7m.
- The second pinch-point is as the road passes Windmill Farm, with the available corridor width narrowing to 10.0m.
- The third pinch-point is the stretch of carriageway passing Saffron Heights, with a corridor width narrowing to 7.5m.
- The fourth pinch-point is located where the road passes the Rollright Stones. Whilst the corridor width at this location measures approximately 12.8m width, this includes the current parking laybys used by visitors.

4.7.5 It is also noted that, whilst the width of the adopted highway (boundary to boundary) may be sufficient to accommodate the 9.3m construction width outlined above for most of the route, long sections are heavily populated with hedgerows and other planting, and as such the useable width, (excluding significant clearance works), is more limited. There may also be services or utilities within the verges which would require protecting or diverting in the event of the carriageway area being widened.

4.7.6 The two options which promote the use of the unclassified road between the A44 and the A4300, but with the addition of a short section of new road, bypassing the Rollright Stones to either the north or south, (Option 2 and Option 3) will have the greatest third party land requirement.

4.7.7 The new sections of carriageway bypassing the stones will have to be constructed fully in third party land, although it is possible that the existing road could remain open in terms of providing for access to the Rollright Stones themselves.

4.7.8 The Eastern Development Link Road (Option 4) is understood to be fully deliverable within the land allocated for development in the West Oxfordshire Local Plan.

4.7.9 The remaining options (Options 5 to 8) are based upon the imposition of traffic orders rather than the construction of new highway, and as such are not expected to have any major associated land take requirement.

4.7.10 A summary of deliverability issues, based upon third party land requirements, is provided in **Table 4-4** (following page).

Table 4-4 - Appraisal Summary: Deliverability

Option	Scheme Details	Deliverability Criteria
		Requirements for third party land
1	Re-routing via Rollright Stones unclassified road	Third party land likely to be required at several pinch-points, including potential realignment passing Saffron Heights
2	Re-routing south of Rollright Stones	Third party land required as per Option 1, but with the additional land required for Rollright Stones southern bypass
3	Re-routing north of Rollright Stones	Third party land required as per Option 1, but with the additional and required for the Rollright Stones northern bypass
4	Re-routing via eastern development link	Land required within the Eastern Development site (subject to junction works at either end of the link)
5	Reclassification of A44	No land requirement
6	Weight restriction on A361	No land requirement
7	Weight restriction on A361 and A3400	No land requirement
8	Weight restriction on Rollright Stones unclassified road	No land requirement

4.8 Cross Boundary Matters

4.8.1 Several of the options considered have the potential to impact upon adjacent authority areas, either in terms of the requirement to carry out physical works within the jurisdiction of other local highway authorities (for example works on the central section of the unclassified road passing the Rollright Stones would fall within Warwickshire), or with the potential for traffic to re-route onto roads falling within adjacent authorities.

4.8.2 When considering physical works, the option with the greatest requirement for works outside of Oxfordshire is expected to be Option 3, in which the Rollright Stones are bypassed to the north. This would require the delivery of a new road within Warwickshire, tying into the existing unclassified road between the A44 and A3400.

4.8.3 The next greatest impact in terms of physical works is expected to be Option 1, in which the existing unclassified road is widened and improved, as a large proportion of the improvement works would take place on a stretch of road within Warwickshire.

4.8.4 Option 2, in which a bypass route is provided to the south of the Rollright Stones, is expected to have a lesser requirement for works outside of Oxfordshire, with the new bypass route being constructed primarily within the County. There would however remain the need for some works to improve sections of the existing unclassified road within Warwickshire.

4.8.5 Options 1 and 3 would also result in the re-routing of traffic (particularly HGV traffic) onto the sections of the unclassified road within Warwickshire, resulting in a greater long-term maintenance liability for the adjacent authority.

4.8.6 The potential for traffic to re-route is also an important factor when considering options based upon the imposition of weight restrictions on current routes. In particular on the A361 (Option 6, or upon both the A361 and the A3400 (Option 7).

4.8.7 Whilst it is not possible to fully predict where HGV traffic may choose to re-route as a result of imposing these restrictions, the following are considered to be potential impacts:

- Increased use of the A44 through the centre of Chipping Norton (as a result of imposing weight restrictions on the A3400)
- Increased use of minor parallel routes to the A361 north-west of Chipping Norton (as a result of imposing weight restrictions on the A361).
- Increased use of the A429 and A422 to the north and west (as a result of imposing weight restrictions on the A361 / A3400).

4.8.8 A summary of the appraisal of cross boundary impacts is provided as **Table 4-5** (following page).

Table 4-5 - Appraisal Summary: Cross Boundary Issues

Option	Scheme Details	Cross Boundary Matters	
		Requirement for physical works in adjacent authority areas	Potential for re-routing through adjacent authority areas
1	Re-routing via Rollright Stones unclassified road	×	×
2	Re-routing south of Rollright Stones	±	±
3	Re-routing north of Rollright Stones	××	××
4	Re-routing via eastern development link	±	±
5	Reclassification of A44	±	×
6	Weight restriction on A361	±	×
7	Weight restriction on A361 and A3400	±	×
8	Weight restriction on Rollright Stones unclassified road	±	±

4.9 Air Quality

4.9.1 The issue of Air Quality within the centre of Chipping Norton is one of the main factors informing this study. As such a separate review of the potential impact of each scheme option on air quality within the town was carried out, with the summary report provided as **Appendix D**.

4.9.2 This assessment was based upon a comparative review of predicted levels of Nitrogen Dioxide (NO_2) and Particulates (PM_{10} and $PM_{2.5}$) in the current (base) year, a forecast year of 2031 (do-minimum), and for each of the option scenarios. A further scenario was also assessed in which the combined effects of the Rollright Stones diversion and the Eastern Development link were considered.

4.9.3 The main findings of the report were that:

4.9.4 Between the base year and forecast year, air quality (particularly with regards to NO_2 levels) is expected to improve as a result of changes in vehicle technology and alternative, cleaner fuels. As a result, the majority of the area covered by the current AQMA is likely to no longer exceed NO_2 threshold levels, with 9 of the 10 receptors currently within the AQMA predicted to have significantly reduced levels of NO_2. The one exception to this being the narrowed section of carriageway at the northern end of the High Street (passing the Blue Boar) where the proximity of buildings to the carriageway results in a 'Canyon Effect'. At this location the NO_2 levels are predicted to remain just above the AQMA thresholds.

4.9.5 The introduction of the different scheme options are predicted to result in generally negligible changes to the overall levels of air quality within the Town Centre. The greatest reduction in NO_2 is related to the delivery of the Eastern Development Link Road, due to the additional predicted reduction in car traffic as well as HGV traffic.

4.9.6 No individual option is predicted to lower the NO_2 levels on the narrow northern section of the High Street sufficiently to remove the AQMA, however, the combination of the Eastern Development Link Road and the Rollright Stones HGV diversion would do so (albeit marginally).

4.9.7 A summary of the Air Quality appraisal is provided in **Table 4-6** (following page).

Table 4-6 - Appraisal Summary: Air Quality

Option	Scheme Details	Air Quality Criteria		
		Max Change in NO_2 Levels ($\mu g/m^3$)	Max Change in PM_{10} Levels ($\mu g/m^3$)	Max Change in $PM_{2.5}$ Levels ($\mu g/m^3$)
1	Re-routing via Rollright Stones unclassified road	-1.91	-0.50	-0.29
2	Re-routing south of Rollright Stones	-1.91	-0.50	-0.29
3	Re-routing north of Rollright Stones	-1.91	-0.50	-0.29
4	Re-routing via eastern development link	-2.30	-0.76	-0.45
5	Reclassification of A44[5]	N/A	N/A	N/A
6	Weight restriction on A361	-1.31	-0.34	-0.20
7	Weight restriction on A361 and A3400	-1.31	-0.34	-0.20
8	Weight restriction on Rollright Stones unclassified road	+0.41	+0.11	+0.06
1 + 4	Rerouting via the Rollright Stones and the Eastern Development Link Road	-4.28	-1.26	-0.75

[5] Whilst this option was not modelled in isolation, imposing a weight restriction through the centre of Chipping Norton would be expected to have a positive effect similar in scale to the combination of Options 1 and 4.

4.10 Archaeology and Heritage

4.10.1 Chipping Norton is a historic market town, with a considerable number of listed buildings within the town, (126 in total), with the buildings fronting onto Market Street and High Street all being listed.

4.10.2 To the west of the Town, the Rollright Stones sit to either side of the unclassified road which forms the basis for Option 1 (and a partial component of Options 2 and 3). These stones form a Scheduled Ancient Monument of considerable local and national importance. As such the assessment work included the commissioning of an initial Archaeological and Heritage Appraisal (appended to this report as **Appendix E**).

4.10.3 Whilst only a preliminary appraisal, this concluded that:

- There was significant risk associated with intensifying the use of the unclassified road passing the Rollright Stones, in terms of the impact upon the setting of the stones themselves.
- That there was reasonable potential for wider archaeology in the areas surrounding the stones, which would have a potential impact upon the routing of any alternative road alignment bypassing the Stones to either the north or the south.
- That there would be potential harm as a result of increasing the numbers of HGVs through the centre of Chipping Norton due to the impact upon the setting on the Conservation area and related impacts in terms of noise, visual impact and air quality.

4.10.4 A summary of the Archaeology and Heritage appraisal is provided in **Table 4-7** (following page).

Table 4-7 - Appraisal Summary: Heritage and Archaeology

Option	Scheme Details	Archaeology and Heritage Criteria		
		Impact on Scheduled Ancient Monument	Potential for wider archaeological impacts	Impact on Conservation Area
1	Re-routing via Rollright Stones unclassified road	××	××	✓
2	Re-routing south of Rollright Stones	±	×	✓
3	Re-routing north of Rollright Stones	±	×	✓
4	Re-routing via eastern development link	±	±	✓
5	Reclassification of A44	±	±	✓
6	Weight restriction on A361	✓	✓	✓
7	Weight restriction on A361 and A3400	✓	✓	✓
8	Weight restriction on Rollright Stones unclassified road	✓	✓	×

4.11 Scheme Costs

4.11.1 Whilst this project did not include the detailed costing of scheme options, reference was made to previous cost assumptions applied to several of the scheme options under consideration.

4.11.2 When considering Options 1,2 and 3, which provide either an improved route on the current alignment of the unclassified road passing the Rollright Stones, or a route which bypasses the stones to either the north or the south, reference was made to the initial costing work included within the 2017 Chipping Norton Transport Options report. This report included high-level cost assumptions covering the following:

- Improving the unclassified road between the A44 and A4300 to 'A' road standards - £6,100,000

- Strengthening / resurfacing sections of the A3400 between the unclassified road and the junction with the A361 (north of Chipping Norton) - £1,000,000
- Junction Improvements / upgrades on the route of upgraded route between the A44 and A3400 - £850,000
- New junction works (A44 / Unclassified Road) - £3,500,000
- New junction works (Unclassified Road / A3400) - £3,500,000

4.11.3 Whilst the full scale of works required, particularly at the junctions to either end of the improved route, cannot be fully defined at this stage, the core package of works, consisting of the upgrade to the route and the minor junctions and accesses along its length total £6,950,000, excluding any abnormal costs, land purchase, or major utility works.

4.11.4 The October 2008 Air Quality Action Plan for High Street and Horsefair identified the potential additional costs related to the provision of a new section of carriageway to bypass the Rollright Stones as being in the order of £2,000,000. These costs should however be treated with caution as there could be currently unidentified constraints or costs associated with archaeology, landscape, ecology and other impacts associated with the construction of a new road link.

4.11.5 Whilst no costs are currently identified for the Eastern Development Link Road, it is expected that this would be delivered as part of the development of the associated residential development. As such the scheme has been considered to be cost neutral. There may however be secondary costs associated with any signage directing HGV traffic to use this route (for some journeys).

4.11.6 The costs of the options based upon the imposition of weight restrictions and the re-routing of traffic are not currently defined and would largely depend on the number of routes effected and the associated level of change in signage required.

4.11.7 A summary of the Costs appraisal is provided as **Table 4-8** (following page).

Table 4-8 - Appraisal Summary: Cost

Option	Scheme Details	Cost Criteria
		Potential Scale of Costs
1	Re-routing via Rollright Stones unclassified road	Range of costs between £6,950,000 - £14,950,000
2	Re-routing south of Rollright Stones	Range of costs between £8,950,000 - £16,950,000
3	Re-routing north of Rollright Stones	Range of costs between £8,950,000 - £16,950,000
4	Re-routing via eastern development link	Neutral cost – delivered by third parties (however may be secondary costs with regards to directional signage).
5	Reclassification of A44	Costs not defined
6	Weight restriction on A361	Costs not defined
7	Weight restriction on A361 and A3400	Costs not defined
8	Weight restriction on Rollright Stones unclassified road	Costs not defined

4.12 Further factors

4.12.1 Whilst the preceding sections of this report provide a summary of the key areas considered within the comparative appraisal of scheme options, there are additional factors which could also influence the delivery of individual options.

4.12.2 **Appendix G** provides a plan which summarises a number of further potential constraints. These include:

- The Crosshands Quarry SSSI at the southern end of the road between the A44 and A4300
- An Iron Age enclosed settlement to the east of the Rollright Stones
- PROW routes
- The wider coverage of the Cotswold Area of Outstanding Natural Beauty (AONB).

4.13 Summary appraisal

4.13.1 A summary of the appraisal exercise detailed within **Table 4-1** to **Table 4-8** is provided as **Appendix H** to this report, with an overall comparative summary provided in **Table 4-9.**

Table 4-9 - Appraisal Summary

Option	Scheme Details	Policy Fit	Connectivity	Reliability	Deliverability	Cross Boundary	Air Quality	Archaeology and Heritage	Costs
1	Re-routing via Rollright Stones unclassified road	0	2	2	-1	-2	3	-3	-1
2	Re-routing south of Rollright Stones	1	2	2	-2	0	3	0	-2
3	Re-routing north of Rollright Stones	1	2	2	-2	-4	3	0	-2
4	Re-routing via eastern development link	2	2	4	0	0	3	1	0
5	Reclassification of A44 (with associated weight restriction with Chipping Norton)	2	2	2	1	-1	3	1	0
6	Weight restriction on A361	2	1	2	1	-1	0	3	0
7	Weight restriction on A361 and A3400	2	1	2	1	-1	0	3	0
8	Weight restriction on Rollright Stones unclassified road	-1	-1	-2	1	0	-3	2	0

4.14 Initial Conclusions

4.14.1 Of the eight scheme options considered, whilst the reclassification of the A44 and the imposition of an associated weight restriction through the centre of the town would result in the greatest reduction in HGV movements through Chipping Norton, this option is reliant upon the identification or delivery of feasible alternative routes, and as such cannot be delivered in isolation.

4.14.2 In terms of scheme options which can be provide alternative options for HGV or other traffic, the delivery of an improved route to the west of Chipping Norton, passing the Rollright Stones, in combination with the Eastern Development Link Road, is predicted to offer the greatest overall level of reduction in HGV movements currently using the A44 through the centre of Chipping Norton.

4.14.3 Of the three Rollright Stones sub-options appraised, the option in which the Stones are bypassed to the south was the least constrained.

4.14.4 However, the delivery of any improved route passing the Rollright Stones would still be expected to be constrained by a number of factors.

4.14.5 A review of heritage constraints identified the proximity of this route to the Rollright Stones Scheduled Ancient Monument as a significant project risk, due to the impact of any improvement scheme, and the associated increase in vehicles, upon the setting of the monument.

4.14.6 In addition, any improvement to the route passing the Rollright Stones would need to take into account cross-boundary matters, due to areas of the improvement works being located within an adjacent authority. The works would also fall fully within the Cotswolds Area of Outstanding Natural Beauty, and would require significant investment to deliver appropriate levels of physical improvements to the route.

4.14.7 In combination these factors would make meeting the economic and environmental case for the delivery of an improved route challenging and would represent areas (both individually and cumulatively) of considerable project risk.

4.14.8 Options which involve the imposition of weight restrictions on roads to the north of the town are predicted to remove reasonable numbers of overall HGV movements from the town centre, but would require the identification of suitable alternative routes, requiring the agreement of adjacent authorities.

4.14.9 The Air Quality Review identified the individual impact of scheme options on the levels of NO_2, PM_{10} and $PM_{2.5}$ within the town centre as negligible, with air quality predicted to improve within the town centre by the forecast year of 2031 due to improvements in vehicle technology.

4.14.10 Of the scheme options considered, the greatest reduction in NO_2 levels was associated with the delivery of the Eastern Development Link Road, followed by the options which improve the unclassified road passing the Rollright Stones.

Appendix A – Matrix of Vehicle Movements

All Movem	01	02	03	04	05	06	07	08	09	10	11	12	13
01	289	938	1444	26	227	135	59	51	238	70	24	46	14
02	525	911	407	61	736	368	226	248	395	91	369	213	10
03	873	473	687	100	158	238	256	182	114	405	293	745	8
04	15	52	63	278	167	51	71	35	23	14	20	75	3
05	94	549	102	131	684	96	78	67	192	44	37	104	8
06	77	280	151	38	137	200	88	87	137	99	68	76	6
07	30	143	150	43	90	80	195	38	40	50	75	107	8
08	28	249	145	33	65	119	67	404	82	47	40	33	6
09	52	280	29	6	61	56	16	16	21	5	21	9	0
10	18	49	258	5	13	32	10	8	7	26	12	10	0
11	12	317	244	23	51	90	97	29	80	75	210	497	1246
12	23	177	578	71	101	84	100	28	41	98	485	314	540
13	4	8	9	1	6	6	13	3	7	4	1334	642	43

Factor **1**

All Movem	01	02	03	04	05	06	07	08	09	10	11	12	13
01	253	823	1267	23	199	118	52	44	209	61	21	40	12
02	460	799	357	53	646	323	198	218	346	80	324	187	8
03	766	415	603	88	139	209	225	160	100	356	257	654	7
04	13	45	55	244	147	44	62	31	20	13	18	66	2
05	82	481	89	115	600	84	68	59	169	38	32	92	7
06	67	245	133	33	120	175	77	76	121	87	60	66	5
07	26	126	132	38	79	70	171	33	35	44	66	94	7
08	24	219	128	29	57	105	59	354	72	41	35	29	5
09	46	245	25	6	54	49	14	14	19	5	19	8	0
10	16	43	226	5	12	28	9	7	6	23	10	9	0
11	11	278	214	20	45	79	85	26	70	66	184	436	1093
12	20	155	507	63	89	73	88	24	36	86	425	276	474
13	4	7	8	1	5	5	11	3	6	3	1170	563	38

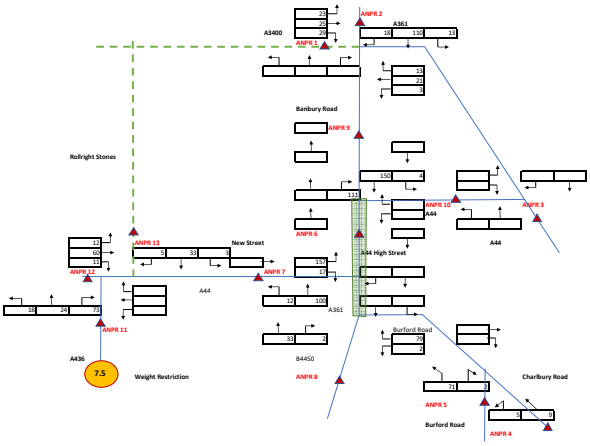
Appendix B – Matrix of HGV Movements

All Movem	01	02	03	04	05	06	07	08	09	10	11	12	13
01	5	23	25	0	7	6	2	1	7	1	1	3	0
02	18	7	13	1	28	10	23	6	8	3	17	16	0
03	21	13	8	1	10	8	21	7	3	8	14	80	0
04	0	2	1	0	5	1	2	0	1	0	1	1	0
05	4	20	2	2	7	3	3	2	22	7	1	7	0
06	2	8	2	0	2	1	1	3	15	19	0	1	0
07	1	4	3	0	4	4	2	0	3	6	2	4	0
08	1	6	6	1	1	4	2	2	5	7	0	1	0
09	1	3	1	0	5	3	1	0	0	0	1	1	0
10	0	1	1	0	0	3	1	0	0	0	0	0	0
11	1	17	7	1	3	5	4	0	22	13	2	18	24
12	1	8	18	0	3	4	4	0	6	16	11	5	12
13	0	0	0	0	1	0	1	0	0	1	33	21	0

Factor **1.14**

All Movem	01	02	03	04	05	06	07	08	09	10	11	12	13
01	5	20	22	0	6	6	2	1	6	1	1	2	0
02	16	6	11	1	25	9	20	5	7	3	15	14	0
03	19	11	7	1	9	7	18	6	3	7	12	71	0
04	0	1	1	0	4	1	2	0	1	0	1	1	0
05	4	17	2	2	6	3	3	1	19	6	1	6	0
06	2	7	2	0	2	1	1	2	13	17	0	1	0
07	1	3	3	0	4	4	1	0	3	5	2	3	0
08	1	5	6	1	1	4	2	1	5	6	0	1	0
09	1	3	1	0	5	2	1	0	0	0	1	1	0
10	0	1	1	0	0	2	1	0	0	0	0	0	0
11	1	15	6	1	2	5	3	0	19	12	2	16	21
12	1	7	16	0	3	3	3	0	5	14	10	4	11
13	0	0	0	0	1	0	1	0	0	1	29	18	0

Appendix C – Scheme Option Assessments



1 **Re-routing HGV's along the unclassified road adjacent to The Rollright Stones**
2 **Re-routing HGV's along a realigned road south of The Rollright Stones**
3 **Re-routing HGV's along a realigned road north of The Rollright Stones**
4 Reclassification of the A44 with a weight restriction through Chipping Norton town centre
5 Weight Restriction on the A361 Banbury Road
6 Weight Restriction on the A361 Banbury Road and A3400
7 Restrictions on the unclassified road adjacent to the Rollright Stones to remove HGV traffic
8 Use of Eastern Relief Road for HGV traffic

All Movers	01	02	03	04	05	06	07	08	09	10	11	12	13
01	5	23	25	0	7	6	2	1	7	1	1	3	0
02	18	7	13	1	28	10	23	6	8	1	17	16	0
03	21	13	8	0	10	8	21	7	3	0	14	80	0
04	0	2	1	0	5	1	2	0	1	0	1	0	0
05	4	20	2	2	7	3	3	2	22	7	1	7	0
06	2	4	2	0	2	1	1	1	15	13	0	1	0
07	1	4	3	0	4	4	2	0	3	1	2	4	0
08	1	6	6	1	1	4	2	2	5	7	0	1	0
09	1	3	1	0	5	1	1	0	0	0	1	1	0
10	0	1	1	0	0	3	1	0	0	0	0	0	0
11	1	17	7	1	3	5	4	0	22	13	2	18	24
12	1	9	18	0	3	4	4	0	6	16	11	5	12
13	0	0	0	0	1	0	1	0	0	1	33	21	0

Rollright Stones Route could be utilised by

All Movers	01	02	03	04	05	06	07	08	09	10	11	12	13
01	0	0	0	0	0	0	0	0	0	0	1	1	0
02	0	0	0	0	0	0	0	0	0	0	1	1	0
03	0	0	0	0	0	0	0	0	0	0	1	1	1
04	0	0	0	0	0	0	0	0	0	0	0	0	0
05	0	0	0	0	0	0	0	0	0	0	0	0	0
06	0	0	0	0	0	0	0	0	0	0	0	0	0
07	1	1	1	0	0	0	0	0	0	1	0	0	0
08	0	0	0	0	0	0	0	0	0	0	0	0	0
09	0	0	0	0	0	0	0	1	0	0	0	1	1
10	0	0	0	0	0	0	0	0	0	0	0	0	0
11	1	1	1	0	0	0	0	0	0	1	1	0	0
12	1	1	1	0	0	0	0	0	0	0	1	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0

Factor 5

All Movers	01	02	03	04	05	06	07	08	09	10	11	12	13
01	5	20	22	0	6	6	2	1	6	1	1	2	0
02	16	6	11	1	25	9	20	5	7	1	15	14	0
03	19	11	7	1	9	7	18	6	3	0	12	71	0
04	0	1	1	0	4	1	2	0	1	0	1	1	0
05	4	17	2	2	6	3	3	1	19	6	1	6	0
06	2	3	2	0	2	1	1	1	13	11	0	1	0
07	1	3	3	0	4	4	1	0	3	1	2	3	0
08	1	5	6	1	1	4	2	2	5	6	0	1	0
09	1	3	1	0	5	1	1	0	0	0	1	1	0
10	0	1	1	0	0	2	1	0	0	0	0	0	0
11	1	15	6	1	2	5	3	0	19	12	2	16	21
12	1	7	16	0	3	3	3	0	5	14	10	4	11
13	0	0	0	0	1	0	1	0	0	1	29	18	0

All Movers	01	02	03	04	05	06	07	08	09	10	11	12	13
01	0	0	0	0	0	0	0	0	0	0	1	0	0
02	0	0	0	0	0	0	0	0	0	0	17	16	0
03	0	0	0	0	0	0	0	0	0	0	14	80	0
04	0	0	0	0	0	0	0	0	0	0	0	0	0
05	0	0	0	0	0	0	0	0	0	0	0	0	0
06	0	0	0	0	0	0	0	0	0	0	0	0	0
07	1	4	3	0	0	0	0	0	0	3	6	0	0
08	0	0	0	0	0	0	0	0	0	0	0	0	0
09	0	0	0	0	0	0	0	0	1	0	0	1	0
10	0	0	0	0	0	0	0	1	0	0	0	0	0
11	1	17	7	1	0	0	0	0	22	13	0	0	0
12	1	8	18	0	0	0	0	0	6	16	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0

Total 260

All Movers	01	02	03	04	05	06	07	08	09	10	11	12	13
01	0%	0%	0%	0%	83%	71%	75%	80%	27%	33%	50%	25%	0%
02	0%	0%	0%	25%	83%	77%	80%	52%	44%	0%	81%	70%	0%
03	25%	0%	0%	0%	48%	75%	88%	65%	15%	22%	75%	87%	0%
04	0%	14%	0%	0%	0%	25%	80%	0%	60%	0%	67%	100%	0%
05	79%	79%	44%	0%	0%	67%	46%	0%	87%	74%	50%	72%	50%
06	80%	91%	90%	50%	60%	0%	0%	50%	93%	90%	100%	33%	0%
07	75%	53%	87%	100%	32%	78%	0%	0%	85%	89%	56%	50%	100%
08	100%	81%	74%	0%	0%	67%	50%	0%	65%	60%	0%	20%	0%
09	33%	64%	0%	0%	78%	91%	67%	100%	0%	0%	100%	100%	0%
10	50%	50%	83%	0%	50%	83%	100%	0%	0%	0%	100%	50%	0%
11	0%	80%	87%	50%	50%	83%	35%	0%	94%	83%	0%	0%	0%
12	0%	71%	88%	100%	58%	71%	81%	50%	80%	92%	0%	0%	0%
13	0%	0%	0%	0%	100%	0%	67%	0%	100%	67%	0%	0%	0%

All Movers	01	02	03	04	05	06	07	08	09	10	11	12	13
01	0	0	0	0	0	0	0	0	0	0	0	1	0
02	0	0	0	0	0	0	0	0	0	0	13	11	0
03	0	0	0	0	0	0	0	0	0	0	10	70	0
04	0	0	0	0	0	0	0	0	0	0	0	0	0
05	0	0	0	0	0	0	0	0	0	0	0	0	0
06	0	0	0	0	0	0	0	0	0	0	0	0	0
07	1	2	1	0	0	0	0	0	3	1	0	0	0
08	0	0	0	0	0	0	0	0	0	0	0	0	0
09	0	0	0	0	0	0	0	1	0	0	0	0	0
10	0	0	0	0	0	0	0	1	0	0	0	0	0
11	0	14	6	0	0	0	0	0	20	11	0	0	0
12	0	0	16	0	0	0	0	0	0	15	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0

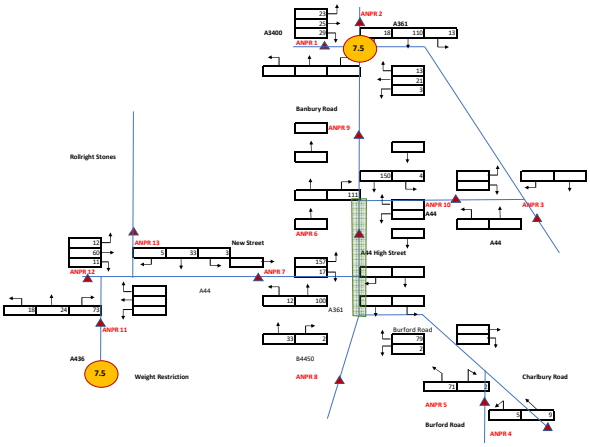
Total 215

NB	SB
0	1
0	25
0	80
0	0
0	0
0	0
14	0
0	0
0	2
0	1
51	0
41	0
0	0
106	109

215

Southern J Northern Junction

1	1
25	25
80	80
0	0
0	0
0	0
14	14
0	0
2	2
1	1
51	51
41	41
0	0
215	215



1 Re-routing HGV's along the unclassified road adjacent to The Rollright Stones
2 Re-routing HGV's along a realigned road south of The Rollright Stones
3 Re-routing HGV's along a realigned road north of The Rollright Stones
4 Reclassification of the A44 with a weight restriction through Chipping Norton town centre
5 **Weight Restriction on the A361 Banbury Road**
6 Weight Restriction on the A361 Banbury Road and A3400
7 Restrictions on the unclassified road adjacent to the Rollright Stones to remove HGV traffic
8 Use of Eastern Relief Road for HGV traffic

All Movers	1	2	3	4	5	6	7	8	9	10	11	12	13
01	0	5	23	25	0	7	6	2	1	7	1	3	0
02	0	18	7	13	1	28	10	23	6	8	1	17	16
03	0	21	13	8	1	10	8	21	7	3	0	14	80
04	0	0	2	1	0	5	1	2	0	1	0	1	0
05	0	4	20	2	2	7	3	3	2	22	7	1	7
06	0	2	4	2	0	2	1	1	1	15	13	0	1
07	0	1	4	3	0	4	2	0	0	3	1	2	4
08	0	1	6	6	1	1	4	2	2	5	7	0	1
09	0	1	3	1	0	5	1	1	0	0	0	1	1
10	0	0	1	1	0	0	0	1	0	0	0	0	0
11	0	1	17	7	1	3	5	4	0	22	13	2	18
12	0	1	9	18	0	3	4	4	0	6	16	11	5
13	0	0	0	0	0	1	0	1	0	0	1	33	21

Factor 1

All Movers	1	2	3	4	5	6	7	8	9	10	11	12	13
01	0	5	20	22	0	6	6	2	1	6	1	1	2
02	0	16	6	11	1	25	9	20	5	7	1	15	14
03	0	19	11	7	1	9	7	18	6	3	0	12	71
04	0	0	1	1	0	4	1	2	0	1	0	1	1
05	0	4	17	2	2	6	3	3	1	19	6	1	6
06	0	2	4	2	0	2	1	1	1	13	11	0	1
07	0	1	3	3	0	4	2	1	0	3	1	2	3
08	0	1	5	6	1	1	4	2	1	5	6	0	1
09	0	1	3	1	0	5	1	1	0	0	0	1	1
10	0	0	1	1	0	0	0	1	0	0	0	0	0
11	0	1	15	6	1	3	5	3	0	19	12	2	16
12	0	1	7	16	0	3	3	4	0	5	14	10	4
13	0	0	0	0	0	1	0	1	0	0	1	29	18

Potential displaced onto A44
Potential displaced onto Rollright Stones 58

NB - the majority of trips displaced onto the A44 would still pass through the AQMA

Weight restrictions on A361 could effect

All Movers	1	2	3	4	5	6	7	8	9	10	11	12	13
01	0	0	0	0	0	0	0	0	0	0	0	0	0
02	0	0	0	0	1	1	1	1	1	0	1	1	1
03	0	0	0	0	0	0	0	0	0	0	0	0	0
04	0	1	0	0	0	0	0	0	0	0	0	0	0
05	0	1	0	0	0	0	0	0	0	0	0	0	0
06	0	1	0	0	0	0	0	0	0	0	0	0	0
07	0	1	0	0	0	0	0	0	0	0	0	0	0
08	0	1	0	0	0	0	0	0	0	0	0	0	0
09	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	1	0	0	0	0	0	0	0	0	0	0	0
11	0	1	0	0	0	0	0	0	0	0	0	0	0
12	0	1	0	0	0	0	0	0	0	0	0	0	0
13	0	1	0	0	0	0	0	0	0	0	0	0	0

All Movers	1	2	3	4	5	6	7	8	9	10	11	12	13
01	0	0	0	0	0	0	0	0	0	0	0	0	0
02	0	0	0	0	1	28	10	23	6	0	3	17	16
03	0	0	0	0	0	0	0	0	0	0	0	0	0
04	0	1	0	0	0	0	0	0	0	0	0	0	0
05	0	20	0	0	0	0	0	0	0	0	0	0	0
06	0	8	0	0	0	0	0	0	0	0	0	0	0
07	0	4	0	0	0	0	0	0	0	0	0	0	0
08	0	0	0	0	0	0	0	0	0	0	0	0	0
09	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	1	0	0	0	0	0	0	0	0	0	0	0
11	0	17	0	0	0	0	0	0	0	0	0	0	0
12	0	8	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0

Total 168

All Movers	01	02	03	04	05	06	07	08	09	10	11	12	13
01	0%	0%	0%	0%	83%	71%	75%	80%	27%	33%	50%	25%	0%
02	0%	0%	0%	25%	83%	77%	80%	52%	44%	0%	81%	70%	0%
03	25%	0%	0%	0%	48%	75%	88%	65%	15%	22%	75%	87%	0%
04	0%	14%	0%	0%	0%	25%	80%	0%	60%	0%	67%	100%	0%
05	79%	79%	44%	0%	0%	67%	46%	0%	87%	74%	50%	72%	50%
06	80%	91%	90%	50%	60%	0%	0%	50%	93%	90%	100%	33%	0%
07	75%	53%	87%	100%	32%	78%	0%	0%	85%	89%	56%	50%	100%
08	100%	81%	74%	0%	0%	67%	50%	0%	65%	60%	0%	20%	0%
09	33%	64%	0%	0%	78%	91%	67%	100%	0%	0%	100%	100%	0%
10	50%	50%	83%	0%	50%	83%	100%	0%	0%	0%	100%	50%	0%
11	0%	80%	87%	50%	50%	83%	35%	0%	94%	83%	0%	0%	0%
12	0%	71%	88%	100%	58%	71%	81%	50%	80%	92%	0%	0%	0%
13	0%	0%	0%	0%	100%	0%	67%	0%	100%	67%	0%	0%	0%

All Movers	1	2	3	4	5	6	7	8	9	10	11	12	13
01	0	0	0	0	0	0	0	0	0	0	0	0	0
02	0	0	0	0	23	8	18	5	0	0	13	11	0
03	0	0	0	0	0	0	0	0	0	0	0	0	0
04	0	0	0	0	0	0	0	0	0	0	0	0	0
05	0	15	0	0	0	0	0	0	0	0	0	0	0
06	0	7	0	0	0	0	0	0	0	0	0	0	0
07	0	2	0	0	0	0	0	0	0	0	0	0	0
08	0	5	0	0	0	0	0	0	0	0	0	0	0
09	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	14	0	0	0	0	0	0	0	0	0	0	0
12	0	6	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0

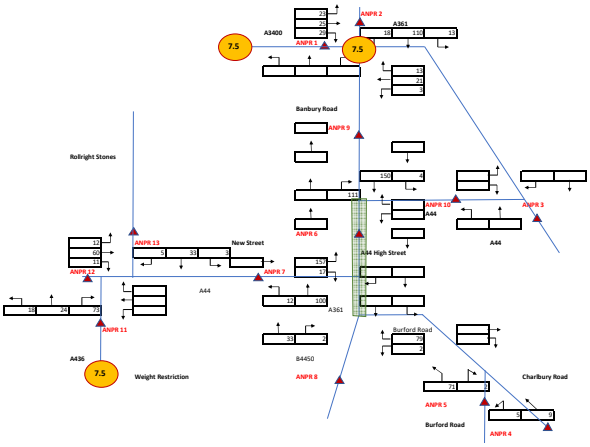
Total 126

NB	SB
0	0
0	77
0	0
0	0
15	0
7	0
2	0
5	0
0	0
0	0
14	0
6	0
0	0
50	77

126

Southern J Northern Junction

0	0
77	77
0	0
0	0
15	15
7	7
2	2
5	5
0	0
0	0
14	14
6	6
0	0
126	126



1 Re-routing HGV's along the unclassified road adjacent to The Rollright Stones
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5 Weight Restriction on the A361 Banbury Road
6 **Weight Restriction on the A361 Banbury Road and A3400**
7 Restrictions on the unclassified road adjacent to the Rollright Stones to remove HGV traffic
8 Use of Eastern Relief Road for HGV traffic

All Movers	1	2	3	4	5	6	7	8	9	10	11	12	13
1	5	23	25	0	7	6	2	1	7	1	1	3	0
2	18	7	13	1	28	10	23	6	8	1	17	16	0
3	21	13	8	1	10	8	21	7	3	0	14	80	0
4	0	2	1	0	5	1	2	0	1	0	1	1	0
5	4	20	2	2	7	3	3	2	22	7	1	7	0
6	2	4	2	0	2	1	1	1	15	13	0	1	0
7	1	4	3	0	4	4	2	0	3	1	2	4	0
8	1	6	6	1	1	4	2	2	5	7	0	1	0
9	1	1	1	0	1	1	1	0	0	0	1	1	0
10	0	1	1	0	0	0	1	0	0	0	0	0	0
11	1	17	7	1	3	5	4	0	22	13	2	18	24
12	1	9	18	0	1	4	4	0	6	16	11	5	12
13	0	0	0	0	1	0	1	0	0	1	33	21	0

Factor 1

All Movers	1	2	3	4	5	6	7	8	9	10	11	12	13
1	5	20	22	0	6	6	2	1	6	1	1	2	0
2	16	6	11	1	25	9	20	5	7	1	15	14	0
3	19	11	7	1	9	7	18	6	3	0	12	71	0
4	0	1	1	0	4	1	2	0	1	0	1	1	0
5	4	17	2	2	6	3	3	1	19	6	1	6	0
6	2	4	2	0	2	1	1	1	13	11	0	1	0
7	1	3	3	0	4	4	1	0	3	1	2	3	0
8	1	5	6	1	1	4	2	1	5	6	0	1	0
9	1	3	1	0	5	2	1	0	0	0	1	1	0
10	0	1	1	0	0	2	1	0	0	0	0	0	0
11	1	15	6	1	2	5	3	0	19	12	2	16	21
12	1	7	16	0	1	3	3	0	5	14	10	4	11
13	0	0	0	0	1	0	1	0	0	1	29	18	0

Potential displaced onto A44
Potential displaced onto Rollright Stones

NB - the majority of trips displaced onto the A44 would still pass through the AQMA

Weight restrictions on A361 & A3400 could effect

All Movers	1	2	3	4	5	6	7	8	9	10	11	12	13
01	0	0	0	0	1	0	0	0	1	0	0	1	1
02	0	0	0	0	1	1	1	1	1	1	0	1	1
03	0	0	0	0	0	0	0	0	0	0	0	0	0
04	0	0	0	0	0	0	0	0	0	0	0	0	0
05	1	1	0	0	0	0	0	0	0	0	0	0	0
06	1	1	0	0	0	0	0	0	0	0	0	0	0
07	1	1	0	0	0	0	0	0	0	0	0	0	0
08	1	1	0	0	0	0	0	0	0	0	0	0	0
09	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0
11	1	1	0	0	0	0	0	0	0	0	0	0	0
12	1	1	0	0	0	0	0	0	0	0	0	0	0
13	1	1	0	0	0	0	0	0	0	0	0	0	0

All Movers	1	2	3	4	5	6	7	8	9	10	11	12	13
01	0	0	0	0	7	6	2	1	0	1	1	0	0
02	0	0	0	1	28	10	23	6	0	1	17	16	0
03	0	0	0	0	0	0	0	0	0	0	0	0	0
04	0	0	0	0	0	0	0	0	0	0	0	0	0
05	0	20	0	0	0	0	0	0	0	0	0	0	0
06	2	8	0	0	0	0	0	0	0	0	0	0	0
07	1	4	0	0	0	0	0	0	0	0	0	0	0
08	1	6	0	0	0	0	0	0	0	0	0	0	0
09	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	1	0	0	0	0	0	0	0	0	0	0	0
11	1	17	0	0	0	0	0	0	0	0	0	0	0
12	1	8	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0

Total 200

All Movers	01	02	03	04	05	06	07	08	09	10	11	12	13
01	0%	0%	0%	0%	83%	71%	75%	80%	27%	33%	50%	25%	0%
02	0%	0%	0%	25%	83%	77%	80%	52%	44%	0%	81%	70%	0%
03	25%	0%	0%	0%	48%	75%	88%	65%	15%	22%	75%	87%	0%
04	0%	14%	0%	0%	0%	25%	80%	0%	60%	0%	67%	100%	0%
05	79%	79%	44%	0%	0%	67%	46%	0%	87%	74%	50%	72%	50%
06	80%	91%	90%	50%	60%	0%	0%	50%	93%	90%	100%	33%	0%
07	75%	53%	87%	100%	32%	78%	0%	0%	85%	89%	56%	50%	100%
08	100%	81%	74%	0%	0%	67%	50%	0%	65%	60%	0%	20%	0%
09	33%	64%	0%	0%	78%	91%	67%	100%	0%	0%	100%	100%	0%
10	50%	50%	83%	0%	50%	83%	100%	0%	0%	0%	100%	50%	0%
11	0%	80%	87%	50%	50%	83%	35%	0%	94%	83%	0%	0%	0%
12	0%	71%	88%	100%	58%	71%	81%	50%	80%	92%	0%	0%	0%
13	0%	0%	0%	0%	100%	0%	67%	0%	100%	67%	0%	0%	0%

All Movers	1	2	3	4	5	6	7	8	9	10	11	12	13
01	0	0	0	0	0	0	1	1	0	0	1	1	0
02	0	0	0	0	23	8	18	5	0	0	13	11	0
03	0	0	0	0	0	0	0	0	0	0	0	0	0
04	0	0	0	0	0	0	0	0	0	0	0	0	0
05	1	15	0	0	0	0	0	0	0	0	0	0	0
06	2	7	0	0	0	0	0	0	0	0	0	0	0
07	1	2	0	0	0	0	0	0	0	0	0	0	0
08	1	5	0	0	0	0	0	0	0	0	0	0	0
09	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	14	0	0	0	0	0	0	0	0	0	0	0
12	0	6	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0

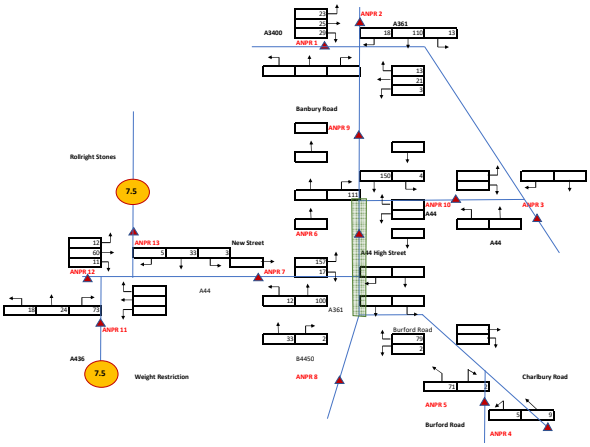
Total 148

NB	SB
0	14
0	77
0	0
0	0
19	0
9	0
3	0
6	0
0	0
1	0
14	0
6	0
0	0
57	91

148

Southern J Northern Junction

14	14
77	77
0	0
0	0
19	19
9	9
3	3
6	6
0	0
1	1
14	14
6	6
0	0
148	148



1 Re-routing HGV's along the unclassified road adjacent to The Rollright Stones
2 Re-routing HGV's along a realigned road south of The Rollright Stones
3 Re-routing HGV's along a realigned road north of The Rollright Stones
4 Reclassification of the A44 with a weight restriction through Chipping Norton town centre
5 Weight Restriction on the A361 Banbury Road
6 Weight Restriction on the A361 Banbury Road and A3400
7 **Restrictions on the unclassified road adjacent to the Rollright Stones to remove HGV traffic**
8 Use of Eastern Relief Road for HGV traffic

All Movements	01	02	03	04	05	06	07	08	09	10	11	12	13
01	5	23	25	0	7	6	2	1	7	1	1	3	0
02	18	7	13	1	28	10	23	6	8	1	17	16	0
03	21	13	8	0	10	8	21	7	3	0	14	80	0
04	0	2	1	0	5	1	2	0	1	0	1	1	0
05	4	20	2	2	7	3	3	2	22	7	1	7	0
06	2	4	2	0	2	1	1	1	15	19	0	1	0
07	1	4	3	0	4	4	2	0	3	1	2	4	0
08	1	6	6	1	1	4	2	2	5	7	0	1	0
09	1	3	1	0	5	1	1	0	0	0	1	1	0
10	0	1	1	0	0	1	1	0	0	1	0	0	0
11	1	17	7	1	3	5	4	0	22	13	2	18	24
12	1	9	18	0	3	4	4	0	6	16	11	5	12
13	0	0	0	0	1	0	1	0	0	1	33	21	0

Weight restrictions on A361 & A3400 could effect

All Movements	01	02	03	04	05	06	07	08	09	10	11	12	13
01	0	0	0	0	0	0	0	0	0	0	1	1	1
02	0	0	0	0	0	0	0	0	0	0	1	1	1
03	0	0	0	0	0	0	0	0	0	0	0	0	0
04	0	0	0	0	0	0	0	0	0	0	0	0	0
05	0	0	0	0	0	0	0	0	0	0	0	0	0
06	0	0	0	0	0	0	0	0	0	0	0	0	0
07	0	0	0	0	0	0	0	0	0	0	0	0	0
08	0	0	0	0	0	0	0	0	0	0	0	0	0
09	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0
11	1	1	0	0	0	0	0	0	0	0	0	0	0
12	1	1	0	0	0	0	0	0	0	0	0	0	0
13	1	1	0	0	0	0	0	0	0	0	0	0	0

Factor 1

All Movements	01	02	03	04	05	06	07	08	09	10	11	12	13
01	5	20	22	0	6	6	2	1	6	1	1	2	0
02	16	6	11	1	25	9	20	5	7	1	15	14	0
03	19	11	7	1	9	7	18	6	3	0	12	71	0
04	0	1	1	0	4	1	2	0	1	0	1	1	0
05	4	17	2	2	6	3	3	1	19	6	1	6	0
06	2	3	2	0	2	1	1	1	13	17	0	1	0
07	1	3	3	0	4	4	1	0	3	1	2	3	0
08	1	5	6	1	1	4	2	1	5	6	0	1	0
09	1	3	1	0	5	2	1	0	0	0	1	1	0
10	0	1	1	0	0	2	1	0	0	0	0	0	0
11	1	15	6	1	2	5	3	0	19	12	2	16	21
12	1	7	16	0	3	3	3	0	5	14	10	4	11
13	0	0	0	0	1	0	1	0	0	1	29	18	0

All Movements	01	02	03	04	05	06	07	08	09	10	11	12	13
01	0	0	0	0	0	0	0	0	0	0	1	0	0
02	0	0	0	0	0	0	0	0	0	0	17	16	0
03	0	0	0	0	0	0	0	0	0	0	0	0	0
04	0	0	0	0	0	0	0	0	0	0	0	0	0
05	0	0	0	0	0	0	0	0	0	0	0	0	0
06	0	0	0	0	0	0	0	0	0	0	0	0	0
07	0	0	0	0	0	0	0	0	0	0	0	0	0
08	0	0	0	0	0	0	0	0	0	0	0	0	0
09	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0
11	1	17	0	0	0	0	0	0	0	0	0	0	0
12	1	8	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0

Potential displaced onto A44 63
Potential displaced onto Rollright Stones 0

NB - the majority of trips displaced onto the A44 would still pass through the AQMA

Total **63**

All Movements	01	02	03	04	05	06	07	08	09	10	11	12	13
01	0%	0%	0%	0%	83%	71%	75%	80%	27%	33%	50%	25%	0%
02	0%	0%	0%	25%	83%	77%	80%	52%	44%	0%	81%	70%	0%
03	25%	0%	0%	0%	48%	75%	88%	65%	15%	22%	75%	87%	0%
04	0%	14%	0%	0%	0%	25%	80%	0%	60%	0%	67%	100%	0%
05	79%	79%	44%	0%	0%	67%	46%	0%	87%	74%	50%	72%	50%
06	80%	91%	90%	50%	60%	0%	0%	50%	93%	90%	100%	33%	0%
07	75%	53%	87%	100%	32%	78%	0%	0%	85%	89%	56%	50%	100%
08	100%	81%	74%	0%	0%	67%	50%	0%	65%	60%	0%	20%	0%
09	33%	64%	0%	0%	78%	91%	67%	100%	0%	0%	100%	100%	0%
10	50%	50%	83%	0%	50%	83%	100%	0%	0%	0%	100%	50%	0%
11	0%	80%	87%	50%	50%	83%	35%	0%	94%	83%	0%	0%	0%
12	0%	71%	88%	100%	58%	71%	81%	50%	80%	92%	0%	0%	0%
13	0%	0%	0%	0%	100%	0%	67%	0%	100%	67%	0%	0%	0%

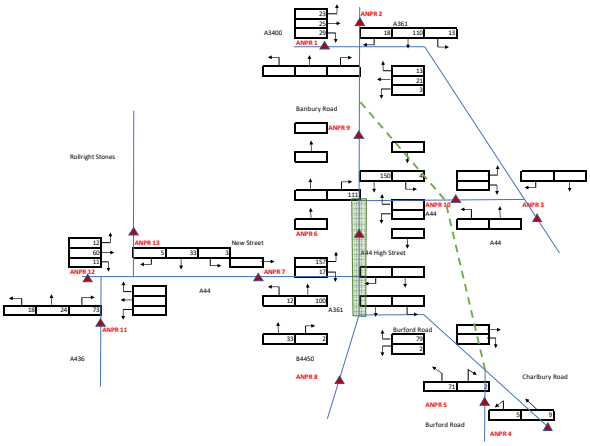
All Movements	01	02	03	04	05	06	07	08	09	10	11	12	13
01	0	0	0	0	0	0	0	0	0	0	1	1	0
02	0	0	0	0	0	0	0	0	0	0	13	11	0
03	0	0	0	0	0	0	0	0	0	0	0	0	0
04	0	0	0	0	0	0	0	0	0	0	0	0	0
05	0	0	0	0	0	0	0	0	0	0	0	0	0
06	0	0	0	0	0	0	0	0	0	0	0	0	0
07	0	0	0	0	0	0	0	0	0	0	0	0	0
08	0	0	0	0	0	0	0	0	0	0	0	0	0
09	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	14	0	0	0	0	0	0	0	0	0	0	0
12	0	6	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0

Total **45**

NB	SB
0	1
0	25
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
14	0
6	0
0	0
19	26
	45

Southern J Northern Junction

1	1
25	25
0	0
0	0
0	0
0	0
0	0
0	0
0	0
14	14
6	6
0	0
45	45



1 Re-routing HGV's along the unclassified road adjacent to The Rollright Stones
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5 Weight Restriction on the A361 Banbury Road
6 Weight Restriction on the A361 Banbury Road and A3400
7 Restrictions on the unclassified road adjacent to the Rollright Stones to remove HGV traffic
8 **Use of Eastern Relief Road for HGV traffic**

All Movers	01	02	03	04	05	06	07	08	09	10	11	12	13
01	5	23	25	0	7	6	2	1	7	1	1	3	0
02	18	7	13	1	28	10	23	6	8	1	17	16	0
03	21	13	8	0	10	8	21	7	3	0	14	80	0
04	0	2	1	0	5	1	2	0	1	0	1	1	0
05	4	20	2	2	7	3	3	2	22	7	1	7	0
06	2	4	2	0	2	1	1	1	15	19	0	1	0
07	1	4	3	0	4	2	0	0	3	1	2	4	0
08	1	6	6	1	1	4	2	2	5	7	0	1	0
09	1	3	1	0	5	1	1	0	0	0	1	1	0
10	0	1	1	0	0	3	1	0	0	0	0	0	0
11	1	17	7	1	3	5	4	0	22	13	2	18	24
12	1	9	18	0	3	4	4	0	6	16	11	5	12
13	0	0	0	0	1	0	1	0	0	1	33	21	0

Factor 1

All Movers	01	02	03	04	05	06	07	08	09	10	11	12	13
01	5	20	22	0	6	6	2	1	6	1	1	2	0
02	16	6	11	1	25	9	20	5	7	1	15	14	0
03	19	11	7	1	9	7	18	6	3	0	12	71	0
04	0	1	1	0	4	1	2	0	1	0	1	1	0
05	4	17	2	2	6	3	3	1	19	6	1	6	0
06	2	4	2	0	2	1	1	1	13	17	0	1	0
07	1	3	3	0	4	4	1	0	3	1	2	3	0
08	1	5	6	1	1	4	2	1	5	6	0	1	0
09	1	3	1	0	5	2	1	0	0	0	1	1	0
10	0	1	1	0	0	2	1	0	0	0	0	0	0
11	1	15	6	1	2	5	3	0	19	12	2	16	21
12	1	7	16	0	3	3	3	0	5	14	10	4	11
13	0	0	0	0	1	0	1	0	0	1	29	18	0

Eastern Relief Road could be utilised by

All Movers	01	02	03	04	05	06	07	08	09	10	11	12	13
01	0	0	0	1	0	0	0	0	1	0	1	0	0
02	0	0	0	1	1	0	0	0	1	0	1	0	0
03	0	0	0	1	1	0	0	0	1	0	0	0	0
04	1	1	1	0	0	0	0	0	0	1	1	0	0
05	1	1	1	0	0	0	0	0	1	1	0	0	0
06	0	0	0	0	0	0	0	0	0	0	0	0	0
07	0	0	0	0	0	0	0	0	0	0	0	0	0
08	1	1	1	0	0	0	0	0	0	1	1	0	0
09	0	0	0	1	1	0	0	0	1	0	1	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0

All Movers	01	02	03	04	05	06	07	08	09	10	11	12	13
01	0	0	0	0	7	0	0	1	0	1	0	0	0
02	0	0	0	1	28	0	0	0	0	3	0	0	0
03	0	0	0	1	10	0	0	0	0	0	0	0	0
04	0	0	1	0	0	0	0	0	1	0	0	0	0
05	0	20	0	0	0	0	0	0	22	7	0	0	0
06	0	0	0	0	0	0	0	0	0	0	0	0	0
07	0	0	0	0	0	0	0	0	0	0	0	0	0
08	0	0	0	0	0	0	0	0	0	0	0	0	0
09	0	0	0	0	0	0	0	0	0	7	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0

Total **157**

All Movers	01	02	03	04	05	06	07	08	09	10	11	12	13
01	0%	0%	0%	0%	83%	71%	75%	80%	27%	33%	50%	25%	0%
02	0%	0%	0%	25%	83%	77%	80%	52%	44%	0%	81%	70%	0%
03	25%	0%	0%	0%	48%	75%	88%	65%	15%	22%	75%	87%	0%
04	0%	14%	0%	0%	0%	25%	80%	0%	60%	0%	67%	100%	0%
05	79%	79%	44%	0%	0%	67%	46%	0%	87%	74%	50%	72%	50%
06	80%	91%	90%	50%	60%	0%	0%	50%	93%	90%	100%	33%	0%
07	75%	53%	87%	100%	32%	78%	0%	0%	85%	89%	56%	50%	100%
08	100%	81%	74%	0%	0%	67%	50%	0%	65%	60%	0%	20%	0%
09	33%	64%	0%	0%	78%	91%	67%	100%	0%	0%	100%	100%	0%
10	50%	50%	83%	0%	50%	83%	100%	0%	0%	0%	100%	50%	0%
11	0%	80%	87%	50%	50%	83%	35%	0%	94%	83%	0%	0%	0%
12	0%	71%	88%	100%	58%	71%	81%	50%	80%	92%	0%	0%	0%
13	0%	0%	0%	0%	100%	0%	67%	0%	100%	67%	0%	0%	0%

All Movers	01	02	03	04	05	06	07	08	09	10	11	12	13
01	0	0	0	0	0	0	0	0	0	0	0	0	0
02	0	0	0	0	23	0	0	0	0	0	0	0	0
03	0	0	0	0	5	0	0	0	0	0	0	0	0
04	0	0	0	0	0	0	0	0	1	0	0	0	0
05	1	15	1	0	0	0	0	0	19	5	0	0	0
06	0	0	0	0	0	0	0	0	0	0	0	0	0
07	0	0	0	0	0	0	0	0	0	0	0	0	0
08	1	5	5	0	0	0	0	0	1	5	0	0	0
09	0	0	0	0	5	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0

Total **111**

NB	SB
0	7
0	27
0	9
1	0
44	0
0	0
0	0
19	0
0	5
0	0
0	0
0	0
0	0
64	48

111

Southern J Northern Junction

7	7
27	27
9	9
1	1
44	44
0	0
0	0
19	19
5	5
0	0
0	0
0	0
0	0
111	111

Appendix D – Air Quality Technical Note

Oxfordshire County Council

Chipping Norton HGV Traffic, Chipping Norton, OX7 5AA

Air Quality Technical Note

September 2020

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Email: NALO@wyg.com

Document control

Project:	Chipping Norton HGV Traffic, Chipping Norton
Client:	Oxfordshire County Council
Job Number:	A118418
File Origin:	O:\Acoustics Air Quality and Noise\Active Projects

Document Checking:

Prepared by:	Donald Towler-Tinlin *Environmental Scientist*	Initialled:	DTT

Checked by:	Matthew Smith *Senior Environmental Consultant*	Initialled:	MS

Verified by:	Nigel Mann *Director*	Initialled:	NM

Issue	Date	Status
1	18th September 2020	First Issue

Contents Page

Figures

Appendices

1. Introduction

WYG has been appointed by Oxfordshire County Council to provide air quality advice regarding HGV traffic movements through Chipping Norton High Street.

The Technical Note has been prepared with the aim of demonstrating the Nitrogen Dioxide (NO_2), and Particulate Matter (PM_{10} and $PM_{2.5}$) concentrations associated with each proposed scenario for different options of routing HGVs.

1.1 Scope of Technical Note

The Technical Note considers the environmental impact in terms of air quality for each of the different proposed HGV traffic routes that utilise the public highway through Chipping Norton.

2. Assessment of Air Quality Impacts

In the context of this technical note, road traffic is identified as the dominant emission source that is likely to cause potential risk of exposure of air pollutants at receptors.

The road traffic modelling assessment therefore consists of the quantified predictions of the change in NO_2, PM_{10} and $PM_{2.5}$ due to changes in traffic movement. Predictions of air quality at the site have been undertaken using ADMS Roads.

In accordance with the provided traffic data, the road traffic modelling assessment has been undertaken with an operational opening year of 2031. The assessment scenarios are therefore:

- 2019 Baseline = Existing baseline conditions;
- 2031 'Do Minimum' = Baseline Scenario + Committed Developments;
- 2031 'Do Something' = Baseline Scenario + Committed Developments + Rollright Stones Option
- 2031 'Do Something' = Baseline Scenario + Committed Developments + Rollright Stones Weight Limit
- 2031 'Do Something' = Baseline Scenario + Committed Developments + A361 Weight Limit
- 2031 'Do Something' = Baseline Scenario + Committed Developments + A361 & A3400 Weight Limit
- 2031 'Do Something' = Baseline Scenario + Committed Developments + Eastern Development Spine Road Option
- 2031 'Do Something' = Baseline Scenario + Committed Developments + Eastern Development Spine Road + RRS

2.1 Existing and Predicted Traffic Flows

Projected 2031 'Do Minimum' and 2031 'Do Something' traffic data have been obtained for the road traffic modelling assessment in the form of Annual Average Daily Traffic figures (AADT). This traffic data was provided by WYG Transport Consultants.

To correspond with the latest West Oxfordshire District Council (WODC) monitoring data and meteorological data, a TEMPro factor of 1.0961 was applied to the provided 2031 baseline to calculate Baseline 2019 traffic flows.

Additional 2019 traffic data was sourced from the Department for Transport (DfT) road statistic database. To calculate the predicted 2031 traffic flows, a TEMPro factor of 1.0961 has been applied.

Emission factors for the 2019 Baseline and 2031 'Do Minimum' and 2031 'Do Something' traffic scenarios have been calculated using the Emission Factor Toolkit Version 10 (August 2020). The EFT and Defra NO_x-to-NO_2 Calculator only calculate emissions up to the year 2030. With the operational year being 2031, it is thought that the emissions will be greater during 2030 than 2031. Therefore, with the emissions being greater during 2030 this assessment will be represent a worse case than 2031 predictions.

A 50m 20km/hr slow down phase is included on each link at every junction and roundabout within the assessment. All of the roads within the dispersion model are illustrated in Figure 1 below. Detailed traffic data is provided in Table 2.1.

Figure 1 **Site Location Plan**

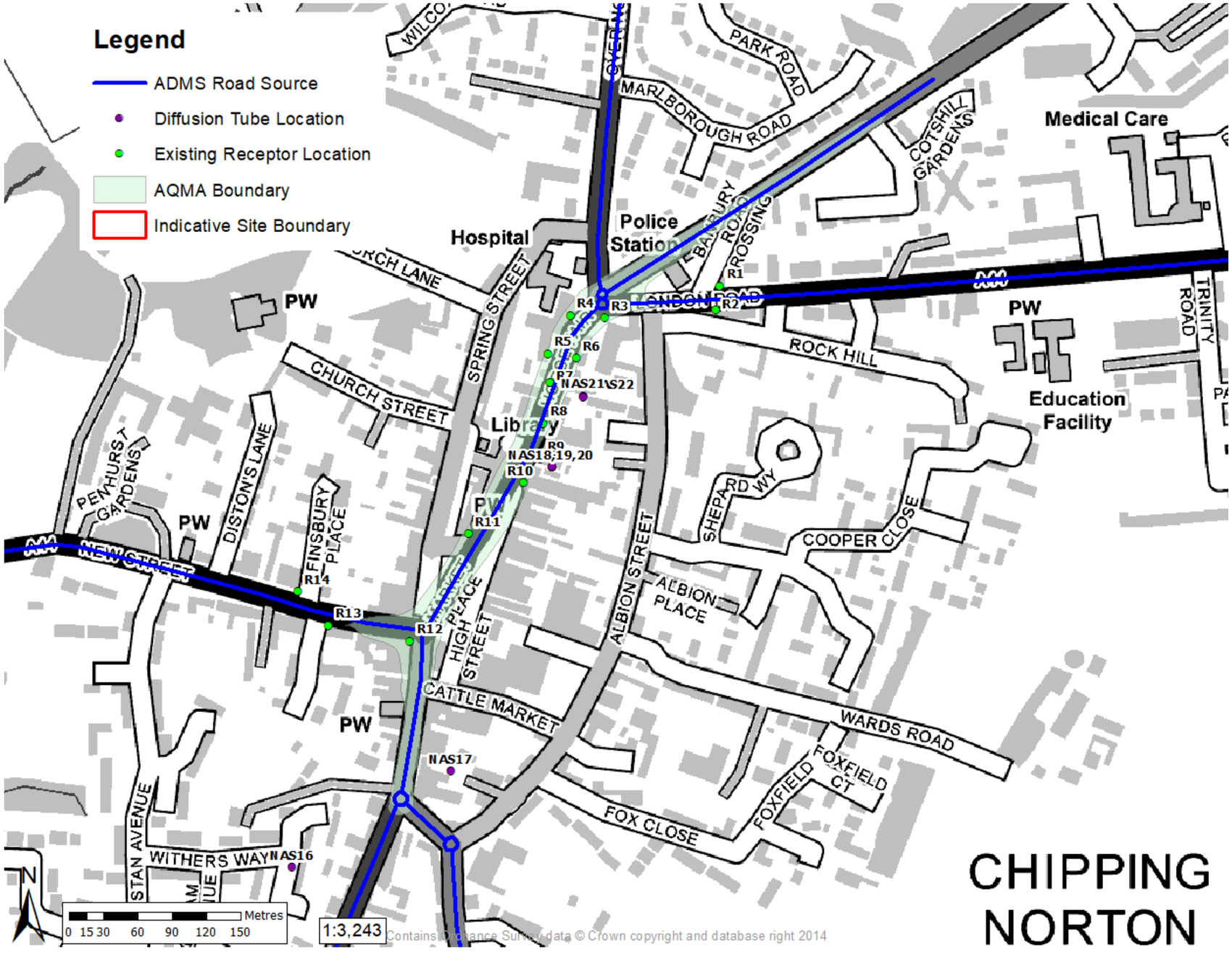


Table 2.1 Traffic Data

Link	Speed (km/h)	2019 Baseline		2031 Do Minimum		2031 Do Something Scenario 1		2031 Do Something Scenario 2		2031 Do Something Scenario 3		2031 Do Something Scenario 4		2031 Do Something Scenario 5		2031 Do Something Scenario 6	
		AADT	HGV %	AADT	%HGV	AADT	%HGV	AADT	%HGV	AADT	%HGV	AADT	%HGV	AADT	%HGV	AADT	%HGV
A44 New Street	48	12066	4.1	13772	4.0	13557	2.4	13818	4.3	13624	2.9	13624	2.9	12734	3.4	12519	1.7
A44 High Street	48/32	12066	4.1	13772	4.0	13557	2.4	13818	4.3	13624	2.9	13624	2.9	12734	3.4	12519	1.7
A44 London Road	48	12066	4.1	13772	4.0	13557	2.4	13818	4.3	13624	2.9	13624	2.9	12734	3.4	12519	1.7
West Street	48	4807	3.2	5269	3.2	5269	3.2	5269	3.2	5269	3.2	5269	3.2	5269	3.2	5269	3.2
Burford Road	48	4807	3.2	5269	3.2	5269	3.2	5269	3.2	5269	3.2	5269	3.2	5269	3.2	5269	3.2
Banbury Road	48	9707	3.4	10640	3.4	10640	3.4	10640	3.4	10640	3.4	10640	3.4	10640	3.4	10640	3.4
Over Norton Road	48	5538	3.1	6070	3.1	6070	3.1	6070	3.1	6070	3.1	6070	3.1	6070	3.1	6070	3.1

2.2 Background Concentrations

The use of background concentrations within the modelling process ensures that pollutant sources other than traffic are represented appropriately. Background sources of pollutants include industrial, domestic and rail emissions within the vicinity of the study site. Several sources have been used to obtain representative background levels as discussed below.

The background concentrations used within the assessment have been determined with reference to the IAQM Guidance and TG (16).

The IAQM Guidance states:

> "*A matter of judgement should take into account the background and future background air quality and whether it is likely to approach or exceed the value of the AQO.*"

Additionally, TG (16) states:

> "*Typically, only the process contributions from local sources are represented within and output by the dispersion model. In these circumstances, it is necessary to add an appropriate background concentration(s) to the modelled source contributions to derive the total pollutant concentrations.*"

Defra Published Background Concentrations for 2018

The background concentrations shown in Table 2.2 below were referenced from the UK National Air Quality Information Archive database based on the National Grid Co-ordinates of 1 x 1 km grid squares nearest to the development site. In May 2019, Defra issued revised 2018 based background maps for nitrogen oxide (NO_X), NO_2, PM_{10} and $PM_{2.5}$. The mapped background concentrations are summarised in Table 2.2.

Table 2.2 Published Background Air Quality Levels (µg/m³)

Receptor Location	2018			
	NO_2	NO_x	PM_{10}	$PM_{2.5}$
Local Authority Monitoring				
NAS22*	7.59	9.75	13.63	8.96
NAS17*	6.98	8.92	13.46	8.87
NAS18 19 20*	7.59	9.75	13.63	8.96
Existing Sensitive Receptors				
R1	7.59	9.75	13.63	8.96
R2	7.59	9.75	13.63	8.96

Receptor Location	2018			
	NO_2	NO_x	PM_{10}	$PM_{2.5}$
R3*	7.59	9.75	13.63	8.96
R4*	7.59	9.75	13.63	8.96
R5*	7.59	9.75	13.63	8.96
R6*	7.59	9.75	13.63	8.96
R7*	7.59	9.75	13.63	8.96
R8*	7.59	9.75	13.63	8.96
R9*	7.59	9.75	13.63	8.96
R10*	7.59	9.75	13.63	8.96
R11*	7.59	9.75	13.63	8.96
R12*	7.59	9.75	13.63	8.96
R13	7.59	9.75	13.63	8.96
R14	7.59	9.75	13.63	8.96
*Located within the AQMA				

All the Defra background concentrations detailed in Table 2.2 for 2018, show that the background levels are predicted to be below the relevant AQO within the study area.

A breakdown of the background source apportionment of NO_X concentrations at each monitoring location and receptor is shown in Table 2.3.

Table 2.3 Pollutant Source Apportionment of NO_X (µg/m³)

Receptor Location	2018						
	Total NO_x	% of NO_x from Road Sources	% of NO_x from Industrial Sources	% of NO_x from Domestic Sources	% of NO_x from Aircraft Sources	% of NO_x from Rail Sources	% of NO_x from Other Sources
Local Authority Monitoring Locations							
NAS22*	9.75	18.73	6.00	9.46	0.02	0.60	0.28
NAS17*	8.92	12.88	5.15	8.84	0.02	0.62	0.22
NAS18 19 20*	9.75	18.73	6.00	9.46	0.02	0.60	0.28
Modelled Receptor Locations							
R1	9.75	18.73	6.00	9.46	0.02	0.60	0.28
R2	9.75	18.73	6.00	9.46	0.02	0.60	0.28
R3*	9.75	18.73	6.00	9.46	0.02	0.60	0.28
R4*	9.75	18.73	6.00	9.46	0.02	0.60	0.28
R5*	9.75	18.73	6.00	9.46	0.02	0.60	0.28
R6*	9.75	18.73	6.00	9.46	0.02	0.60	0.28
R7*	9.75	18.73	6.00	9.46	0.02	0.60	0.28
R8*	9.75	18.73	6.00	9.46	0.02	0.60	0.28
R9*	9.75	18.73	6.00	9.46	0.02	0.60	0.28
R10*	9.75	18.73	6.00	9.46	0.02	0.60	0.28
R11*	9.75	18.73	6.00	9.46	0.02	0.60	0.28

Receptor Location	2018						
	Total NO_x	% of NO_x from Road Sources	% of NO_x from Industrial Sources	% of NO_x from Domestic Sources	% of NO_x from Aircraft Sources	% of NO_x from Rail Sources	% of NO_x from Other Sources
R12*	9.75	18.73	6.00	9.46	0.02	0.60	0.28
R13	9.75	18.73	6.00	9.46	0.02	0.60	0.28
R14	9.75	18.73	6.00	9.46	0.02	0.60	0.28
*Located within the AQMA							

Table 2.3 above shows that the major background source of NO_x at the monitoring and sensitive receptor locations, where sources have been identified is comprised of 'other sources' but road sources make up the bulk of identified sources.

A review of the Defra background concentrations shows that the NO_2 concentrations at the monitoring and sensitive receptor locations are lower in comparison to the LA monitoring. For the ecological sensitive receptor locations, a review of the NO_x background concentrations using the Air Pollution Information System (APIS) website[1] has been undertaken. A detailed search for these conservation sites on the website has determined the background concentration. The background concentrations at the conservation sites are considered to be the most representative.

Table 2.4 shows the background concentrations utilised within the verification.

Table 2.4 Utilised Background Concentrations (µg/m³)

Receptor Location	2018		Source
	NO_2	NO_x	
Local Authority Monitoring			
NAS22*	7.59	9.75	Defra Published Backgrounds
NAS17*	6.98	8.92	
NAS18 19 20*	7.59	9.75	
Existing Sensitive Receptors			
R1	14.50	9.75	Urban Background Monitoring Tube NAS16
R2	14.50	9.75	
R3*	14.50	9.75	
R4*	14.50	9.75	
R5*	14.50	9.75	
R6*	14.50	9.75	
R7*	14.50	9.75	
R8*	14.50	9.75	
R9*	14.50	9.75	
R10*	14.50	9.75	
R11*	14.50	9.75	

[1] http://www.apis.ac.uk/

Receptor Location	2018		Source
	NO_2	NO_x	
R12*	14.50	9.75	
R13	14.50	9.75	
R14	14.50	9.75	
*Located within the AQMA			

2.3 Model Verification

Model verification involves the comparison of modelled data to monitored data in order to gain the best possible representation of current pollutant concentrations for the assessment years. The verification process is in general accordance with that contained in Section 7 of the TG16 guidance note and uses the most recently available diffusion tube monitoring data to best represent this.

The verification process consists of using the monitoring data and the published background air quality data in the UK National Air Quality Information Archive to calculate the road traffic contribution of NO_X at the monitoring locations. Outputs from the ADMS Roads model are provided as predicted road traffic contribution NO_X emissions. These are converted into predicted roadside contribution NO_2 exposure at the relevant receptor locations based on the updated approach to deriving NO_2 from NO_X for road traffic sources published in Local Air Quality Management TG16. The calculation was derived using the NO_X to NO_2 worksheet in the online LAQM tools website hosted by Defra. Table 2.5 summarises the final model/monitored data correlation following the application of the model correction factor.

Table 2.5 Comparison of Roadside Modelling & Monitoring Results for NO_2

Tube location	NO_2 µg/m^3		
	Monitored NO_2	Modelled NO_2	Difference (%)
NAS22*	43.90	41.87	-4.62
NAS17*	21.50	23.43	8.96
NAS18 19 20*	29.00	31.28	7.87
*Located within the AQMA			

The final model produced data at the monitoring locations to within 10% of the monitoring results at all of the receptors, as recommended by TG16 guidance.

The final verification model correlation coefficient (representing the model uncertainty) is 0.99[2]. This figure demonstrates that the model predictions were in line with the road traffic emissions at the monitoring locations.

[2] This was achieved by applying a model correction factor of 2.44 to roadside predicted NO_X concentrations before converting to NO_2

2.4 Summary of Model Inputs

Parameter	Description	Input Value
Chemistry	A facility within ADMS-Roads to calculate the chemical reactions in the atmosphere between Nitric Oxide (NO), NO_2, Ozone (O_3) and Volatile organic compounds (VOCs).	No atmospheric chemistry parameters included
Meteorology	Representative meteorological data from a local source	**Brize Norton Meteorological Station**, hourly sequential data
Surface Roughness	A setting to define the surface roughness of the model area based upon its location.	**0.5m** representing a typical surface roughness for **Parkland, Open Suburbia** were used for both Site Data and Met Measurement Site Data
Latitude	Allows the location of the model area to be set	United Kingdom = **51.9**
Monin-Obukhov Length	This allows a measure of the stability of the atmosphere within the model area to be specified depending upon its character.	Small Towns = **10m** was used for Site Data Mixed Urban Industrial = **30m** was used for Met Measurement Site Data
Elevation of Road	Allows the height of the road link above ground level to be specified.	All road links were set at ground level = **0m**.
Road Width	Allows the width of the road link to be specified.	Road width used depended on data obtained from OS map data for the specific road link
Topography	This enables complex terrain data to be included within the model in order to account for turbulence and plume spread effects of topography	No topographical information used
Time Varied Emissions	This enables daily, weekly or monthly variations in emissions to be applied to road sources	No time varied emissions used
Road Type	Allows the effect of different types of roads to be assessed.	**Rural (Not London)** settings were used for the relevant links
Road Speeds	Enables individual road speeds to be added for each road link	Based on Google Map observations
Canyon Height	Allows the model to take account turbulent flow patterns occurring inside a street with relatively tall buildings on both sides, known as a "street canyon".	A canyon height of 7m has been used within the model along sections of High Street.
Road Source Emissions	Road source emission rates are calculated from traffic flow data using the in-built EFT database of traffic emission factors.	The **EFT** Version **10.1 (2020)** dataset was used.
Year	Predicted EFT emissions rates depend on the year of emission.	**2018** data for verification and baseline . **2030** data for the road traffic assessment.

3. HGV Traffic Modelling Results

3.1 Scenario 1 - Rollright Stones Option

Table 3.1 (below) presents a summary of the predicted change in NO_2 concentrations at relevant receptor locations, due to changes in traffic flow associated with the development, based on modelled 'do minimum' and 'do something' scenarios.

Table 3.1 Predicted Annual Average Concentrations of NO_2 at Receptor Locations

Receptor		NO_2 (µg/m³)			
		Baseline 2019	Do Minimum 2031	Do Something 2031	Development Contribution
R1	1 London Road	35.98	22.65	22.27	-0.39
R2	2 London Road	34.79	21.98	21.60	-0.38
R3*	31 Horse Fair	45.16	26.50	25.79	-0.70
R4*	18a Horse Fair	31.36	20.57	20.22	-0.36
R5*	8 Horse Fair	28.65	19.66	19.28	-0.39
R6*	15 Horse Fair	44.05	26.29	25.32	-0.97
R7*	4 Horse Fair	44.46	26.17	25.14	-1.03
R8*	31 High Street	80.43	43.23	41.32	-1.91
R9*	26 High Street	24.92	18.32	18.14	-0.19
R10*	24 High Street	24.97	18.34	18.17	-0.18
R11*	1a Middle Row	23.42	17.72	17.55	-0.17
R12*	6 New Street	28.91	19.69	19.51	-0.18
R13	20 New Street	26.71	18.82	18.65	-0.17
R14	35 New Street	30.10	20.32	20.10	-0.22
Annual Mean AQO		**40 µg/m³**			
*Located within the AQMA					

All modelled existing receptors, including those located within the AQMA, are predicted to be below the AQO for NO_2 in both the 'do minimum' and 'do something' scenarios.

As indicated in Table 3.1, the minimum predicted decrease in the annual average exposure to NO_2 at any existing receptor, due to changes in traffic movements associated with the development, is -0.17 µg/m³ at 1a Middle Row (R11) and 20 New Street (R13). The maximum predicted decrease in the annual average exposure to NO_2 at any existing receptor, due to changes in traffic movements associated with the development, is -1.91 µg/m³ at 31 High Street (R8).

The impact description of changes in traffic flow associated with the development with respect to annual mean NO_2 exposure has been assessed. The outcomes of the assessment are summarised in Table 3.2 (below).

Table 3.2 Impact Description of Effects at Key Receptors (NO_2)

NO_2 Impact Description of Effects at Key Receptors					
Recep.	**Change Due to Development (DS-DM) (µg/m³)**	**% of AQO**	**% Change in Concentration Relative to AQO**	**% Annual Mean Concentration in Assessment Year**	**Impact Descriptor**
R1	-0.39	-0.97	1%	≤75% of AQO	Negligible
R2	-0.38	-0.94	1%	≤75% of AQO	Negligible
R3*	-0.70	-1.76	2-5%	≤75% of AQO	Negligible
R4*	-0.36	-0.89	1%	≤75% of AQO	Negligible
R5*	-0.39	-0.97	1%	≤75% of AQO	Negligible
R6*	-0.97	-2.43	2-5%	≤75% of AQO	Negligible
R7*	-1.03	-2.58	2-5%	≤75% of AQO	Negligible
R8*	-1.91	-4.78	2-5%	103-109% of AQO	Moderate
R9*	-0.19	-0.47	0%	≤75% of AQO	Negligible
R10*	-0.18	-0.45	0%	≤75% of AQO	Negligible
R11*	-0.17	-0.42	0%	≤75% of AQO	Negligible
R12*	-0.18	-0.45	0%	≤75% of AQO	Negligible
R13	-0.17	-0.42	0%	≤75% of AQO	Negligible
R14	-0.22	-0.54	1%	≤75% of AQO	Negligible
+0% means a change of <0.5% as per explanatory note 2 of table 6.3 of the EPUK IAQM Guidance.					
*Located within the AQMA					

The impact description of the effects of changes in traffic flow as a result of the proposed development, with respect to NO_2 exposure for existing receptors, is determined to be 'negligible' at all existing receptor locations, except R8 which is determined to be 'moderate'. Given the quantitative nature of the assessment and the verification of the air quality dispersion model, the confidence of the assessment is deemed to be 'high'.

Figure 3.1 Annual Average Nitrogen Dioxide (µgm^{-3}) Concentrations Across the Study Area

Figure 3.2 Annual Average Nitrogen Dioxide (µgm^{-3}) Contribution from Scenario 1 Across the Study Area

Particulate Matter (PM_{10})

Table 3.3 presents a summary of the predicted change in annual mean PM_{10} concentrations at relevant receptor locations, due to changes in traffic flow associated with the development, based on modelled 'do minimum' and 'do something' scenarios.

Table 3.3 Predicted Annual Average Concentrations of PM_{10} at Receptor Locations

Receptor		PM_{10} (µg/m^3)			
		Baseline 2019	Do Minimum 2031	Do Something 2031	Development Contribution
R1	1 London Road	16.42	16.52	16.38	-0.14
R2	2 London Road	16.24	16.28	16.14	-0.14
R3*	31 Horse Fair	17.28	17.40	17.21	-0.19
R4*	18a Horse Fair	15.53	15.50	15.41	-0.09
R5*	8 Horse Fair	15.13	15.13	15.04	-0.08
R6*	15 Horse Fair	16.73	16.79	16.62	-0.17

Receptor		PM_{10} (µg/m³)			
		Baseline 2019	Do Minimum 2031	Do Something 2031	Development Contribution
R7*	4 Horse Fair	16.71	16.68	16.50	-0.18
R8*	31 High Street	22.09	22.60	22.11	-0.50
R9*	26 High Street	14.98	15.04	14.97	-0.08
R10*	24 High Street	15.01	15.09	15.00	-0.08
R11*	1a Middle Row	14.73	14.76	14.70	-0.06
R12*	6 New Street	15.59	15.63	15.53	-0.10
R13	20 New Street	15.40	15.43	15.33	-0.10
R14	35 New Street	15.96	16.11	15.97	-0.14
Annual Mean AQO		**40 µg/m³**			
*Located within the AQMA					

All modelled existing receptors are predicted to be below the AQO for PM_{10} in both the 'do minimum' and 'do something' scenarios.

As indicated in Table 3.3, the minimum predicted decrease in the annual average exposure to PM_{10} at any existing receptor, due to changes in traffic movements associated with the development, is -0.06 µg/m³ at 1a Middle Row (R11). The maximum predicted decrease in the annual average exposure to PM_{10} at any existing receptor, due to changes in traffic movements associated with the development, is -0.50 µg/m³ at 31 High Street (R8).

The impact description of changes in traffic flow associated with the development with respect to annual mean PM_{10} exposure has been assessed. The outcomes of the assessment are summarised in Table 3.4.

Table 3.4 Impact Description of Effects at Key Receptors (PM_{10})

PM_{10} Impact Description of Effects at Key Receptors					
Recep.	Change Due to Development (DS-DM) (µg/m³)	% of AQO	% Change in Concentration Relative to AQO	% Annual Mean Concentration in Assessment Year	Impact Descriptor
R1	-0.14	-0.35	0%	≤75% of AQO	Negligible
R2	-0.14	-0.35	0%	≤75% of AQO	Negligible
R3*	-0.19	-0.47	0%	≤75% of AQO	Negligible
R4*	-0.09	-0.23	0%	≤75% of AQO	Negligible
R5*	-0.08	-0.20	0%	≤75% of AQO	Negligible
R6*	-0.17	-0.43	0%	≤75% of AQO	Negligible
R7*	-0.18	-0.44	0%	≤75% of AQO	Negligible
R8*	-0.50	-1.24	1%	≤75% of AQO	Negligible
R9*	-0.08	-0.20	0%	≤75% of AQO	Negligible
R10*	-0.08	-0.20	0%	≤75% of AQO	Negligible
R11*	-0.06	-0.16	0%	≤75% of AQO	Negligible

PM_{10} Impact Description of Effects at Key Receptors					
Recep.	**Change Due to Development (DS-DM) (µg/m³)**	**% of AQO**	**% Change in Concentration Relative to AQO**	**% Annual Mean Concentration in Assessment Year**	**Impact Descriptor**
R12*	-0.10	-0.24	0%	≤75% of AQO	Negligible
R13	-0.10	-0.26	0%	≤75% of AQO	Negligible
R14	-0.14	-0.36	0%	≤75% of AQO	Negligible
+0% means a change of <0.5% as per explanatory note 2 of table 6.3 of the EPUK IAQM Guidance.					
*Located within the AQMA					

The impact description of the effects of changes in traffic flow as a result of the proposed development, with respect to PM_{10} exposure for existing receptors, including those within the AQMA, is determined to be 'negligible' at all receptors.

Particulate Matter ($PM_{2.5}$)

Table 3.5 (below) presents a summary of the predicted change in annual mean $PM_{2.5}$ concentrations at relevant receptor locations, due to changes in traffic flow associated with the development, based on modelled 'do minimum' and 'do something' scenarios.

Table 3.5 Predicted Annual Average Concentrations of $PM_{2.5}$ at Receptor Locations

Receptor		**$PM_{1.5}$ (µg/m³)**			
		Baseline 2019	**Do Minimum 2031**	**Do Something 2031**	**Development Contribution**
R1	1 London Road	10.72	10.66	10.58	-0.08
R2	2 London Road	10.61	10.52	10.44	-0.08
R3*	31 Horse Fair	11.31	11.20	11.09	-0.11
R4*	18a Horse Fair	10.18	10.07	10.02	-0.05
R5*	8 Horse Fair	9.93	9.85	9.80	-0.05
R6*	15 Horse Fair	10.99	10.86	10.75	-0.10
R7*	4 Horse Fair	10.98	10.80	10.69	-0.11
R8*	31 High Street	14.45	14.33	14.03	-0.29
R9*	26 High Street	9.81	9.79	9.74	-0.04
R10*	24 High Street	9.83	9.81	9.77	-0.05
R11*	1a Middle Row	9.66	9.63	9.59	-0.04
R12*	6 New Street	10.19	10.13	10.08	-0.06
R13	20 New Street	10.06	10.01	9.95	-0.06
R14	35 New Street	10.40	10.41	10.33	-0.08
Annual Mean AQO		**25 µg/m³**			
*Located within the AQMA					

All modelled existing receptors are predicted to be below the AQO for $PM_{2.5}$ in both the 'do minimum' and 'do something' scenarios.

As indicated in Table 3.5, the minimum predicted decrease in the annual average exposure to $PM_{2.5}$ at any existing receptor, due to changes in traffic movements associated with the development, is -0.04 µg/m^3 at 26 High Street (R9) and 1a Middle Row (R11). The maximum predicted decrease in the annual average exposure to $PM_{2.5}$ at any existing receptor, due to changes in traffic movements associated with the development, is -0.29 µg/m^3 at 31 High Street (R8).

The impact description of changes in traffic flow associated with the development with respect to annual mean $PM_{2.5}$ exposure has been assessed. The outcomes of the assessment are summarised in Table 3.6 (below).

Table 3.6 Impact Description of Effects at Key Receptors ($PM_{2.5}$)

$PM_{2.5}$ Impact Description of Effects at Key Receptors					
Recep.	**Change Due to Development (DS-DM) (µg/m³)**	**% of AQO**	**% Change in Concentration Relative to AQO**	**% Annual Mean Concentration in Assessment Year**	**Impact Descriptor**
R1	-0.08	-0.33	0%	≤75% of AQO	Negligible
R2	-0.08	-0.32	0%	≤75% of AQO	Negligible
R3*	-0.11	-0.44	0%	≤75% of AQO	Negligible
R4*	-0.05	-0.22	0%	≤75% of AQO	Negligible
R5*	-0.05	-0.19	0%	≤75% of AQO	Negligible
R6*	-0.10	-0.41	0%	≤75% of AQO	Negligible
R7*	-0.11	-0.42	0%	≤75% of AQO	Negligible
R8*	-0.29	-1.17	1%	≤75% of AQO	Negligible
R9*	-0.04	-0.18	0%	≤75% of AQO	Negligible
R10*	-0.05	-0.18	0%	≤75% of AQO	Negligible
R11*	-0.04	-0.14	0%	≤75% of AQO	Negligible
R12*	-0.06	-0.22	0%	≤75% of AQO	Negligible
R13	-0.06	-0.24	0%	≤75% of AQO	Negligible
R14	-0.08	-0.32	0%	≤75% of AQO	Negligible
+0% means a change of <0.5% as per explanatory note 2 of table 6.3 of the EPUK IAQM Guidance.					
*Located within the AQMA					

The impact description of the effects of changes in traffic flow as a result of the proposed development, with respect to $PM_{2.5}$ exposure for existing receptors, including those within the AQMA, is determined to be 'negligible' at all receptors.

3.2 Scenario 2 - Rollright Stones Weight Limit

Table 3.7 (below) presents a summary of the predicted change in NO_2 concentrations at relevant receptor locations, due to changes in traffic flow associated with the development, based on modelled 'do minimum' and 'do something' scenarios.

Table 3.7 Predicted Annual Average Concentrations of NO_2 at Receptor Locations

Receptor		NO_2 (µg/m³)			
		Baseline 2019	Do Minimum 2031	Do Something 2031	Development Contribution
R1	1 London Road	35.98	22.65	22.73	0.08
R2	2 London Road	34.79	21.98	22.07	0.09
R3*	31 Horse Fair	45.16	26.50	26.65	0.15
R4*	18a Horse Fair	31.36	20.57	20.65	0.08
R5*	8 Horse Fair	28.65	19.66	19.74	0.08
R6*	15 Horse Fair	44.05	26.29	26.50	0.21
R7*	4 Horse Fair	44.46	26.17	26.40	0.23
R8*	31 High Street	80.43	43.23	43.64	0.41
R9*	26 High Street	24.92	18.32	18.36	0.04
R10*	24 High Street	24.97	18.34	18.38	0.04
R11*	1a Middle Row	23.42	17.72	17.75	0.03
R12*	6 New Street	28.91	19.69	19.73	0.04
R13	20 New Street	26.71	18.82	18.85	0.03
R14	35 New Street	30.10	20.32	20.36	0.05
Annual Mean AQO		**40 µg/m³**			
*Located within the AQMA					

All modelled existing receptors, including those located within the AQMA, are predicted to be below the AQO for NO_2 in both the 'do minimum' and 'do something' scenarios.

As indicated in Table 3.7, the maximum predicted increase in the annual average exposure to NO_2 at any existing receptor, due to changes in traffic movements associated with the development, is 0.41 µg/m³ at 31 High Street (R8).

The impact description of changes in traffic flow associated with the development with respect to annual mean NO_2 exposure has been assessed. The outcomes of the assessment are summarised in Table 3.8 (below).

Table 3.8 Impact Description of Effects at Key Receptors (NO_2)

NO_2 Impact Description of Effects at Key Receptors					
Recep.	**Change Due to Development (DS-DM) (µg/m³)**	**% of AQO**	**% Change in Concentration Relative to AQO**	**% Annual Mean Concentration in Assessment Year**	**Impact Descriptor**
R1	0.08	0.20	0%	≤75% of AQO	Negligible
R2	0.09	0.22	0%	≤75% of AQO	Negligible
R3*	0.15	0.37	0%	≤75% of AQO	Negligible
R4*	0.08	0.20	0%	≤75% of AQO	Negligible
R5*	0.08	0.20	0%	≤75% of AQO	Negligible
R6*	0.21	0.52	1%	≤75% of AQO	Negligible
R7*	0.23	0.57	1%	≤75% of AQO	Negligible
R8*	0.41	1.02	1%	103-109% of AQO	Moderate
R9*	0.04	0.10	0%	≤75% of AQO	Negligible
R10*	0.04	0.10	0%	≤75% of AQO	Negligible
R11*	0.03	0.07	0%	≤75% of AQO	Negligible
R12*	0.04	0.10	0%	≤75% of AQO	Negligible
R13	0.03	0.07	0%	≤75% of AQO	Negligible
R14	0.05	0.12	0%	≤75% of AQO	Negligible
+0% means a change of <0.5% as per explanatory note 2 of table 6.3 of the EPUK IAQM Guidance.					
*Located within the AQMA					

The impact description of the effects of changes in traffic flow as a result of the proposed development, with respect to NO_2 exposure for existing receptors, is determined to be 'negligible' at all existing receptor locations, except R8 which is determined to be 'moderate'. Given the quantitative nature of the assessment and the verification of the air quality dispersion model, the confidence of the assessment is deemed to be 'high'.

Figure 3.3 Annual Average Nitrogen Dioxide (µgm^{-3}) Concentrations Across the Study Area

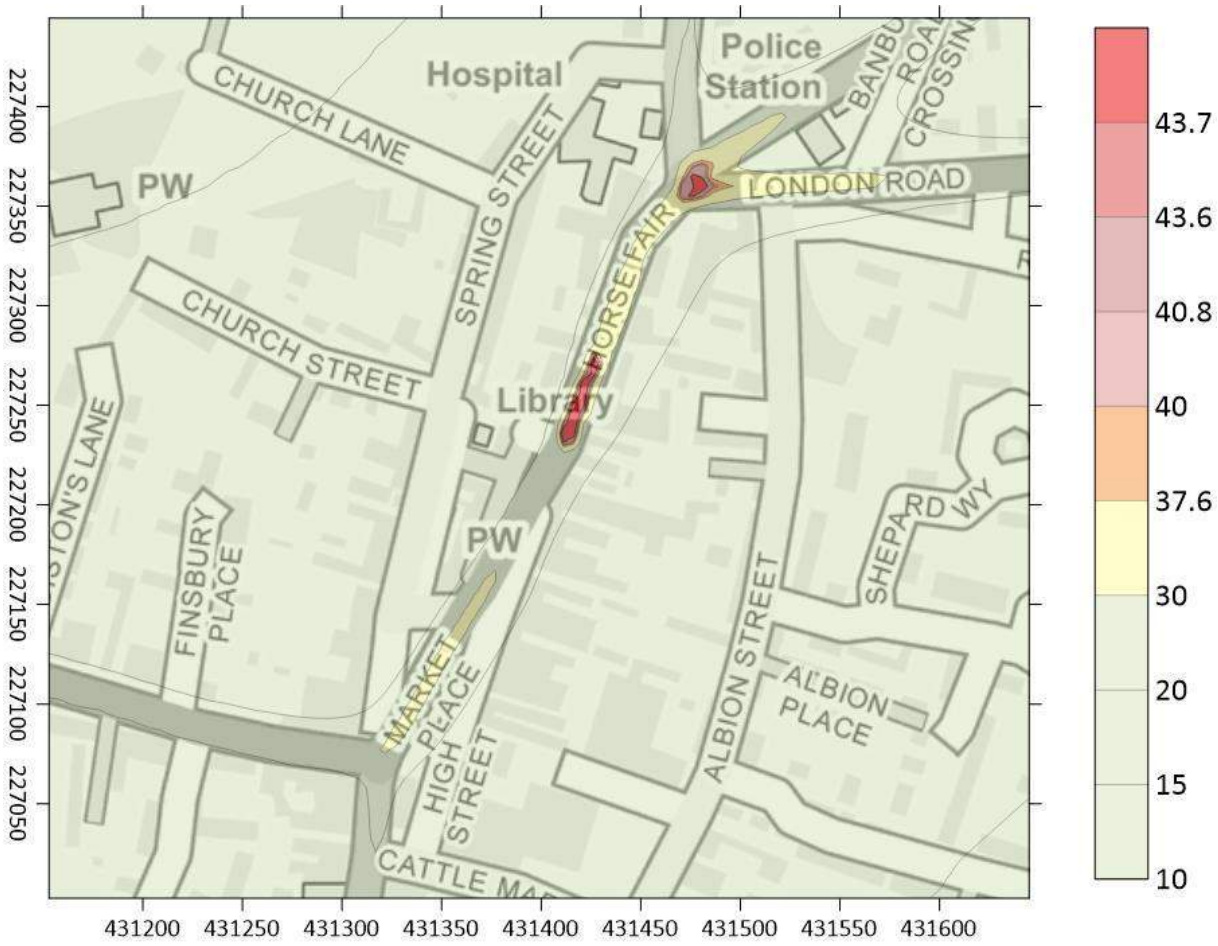
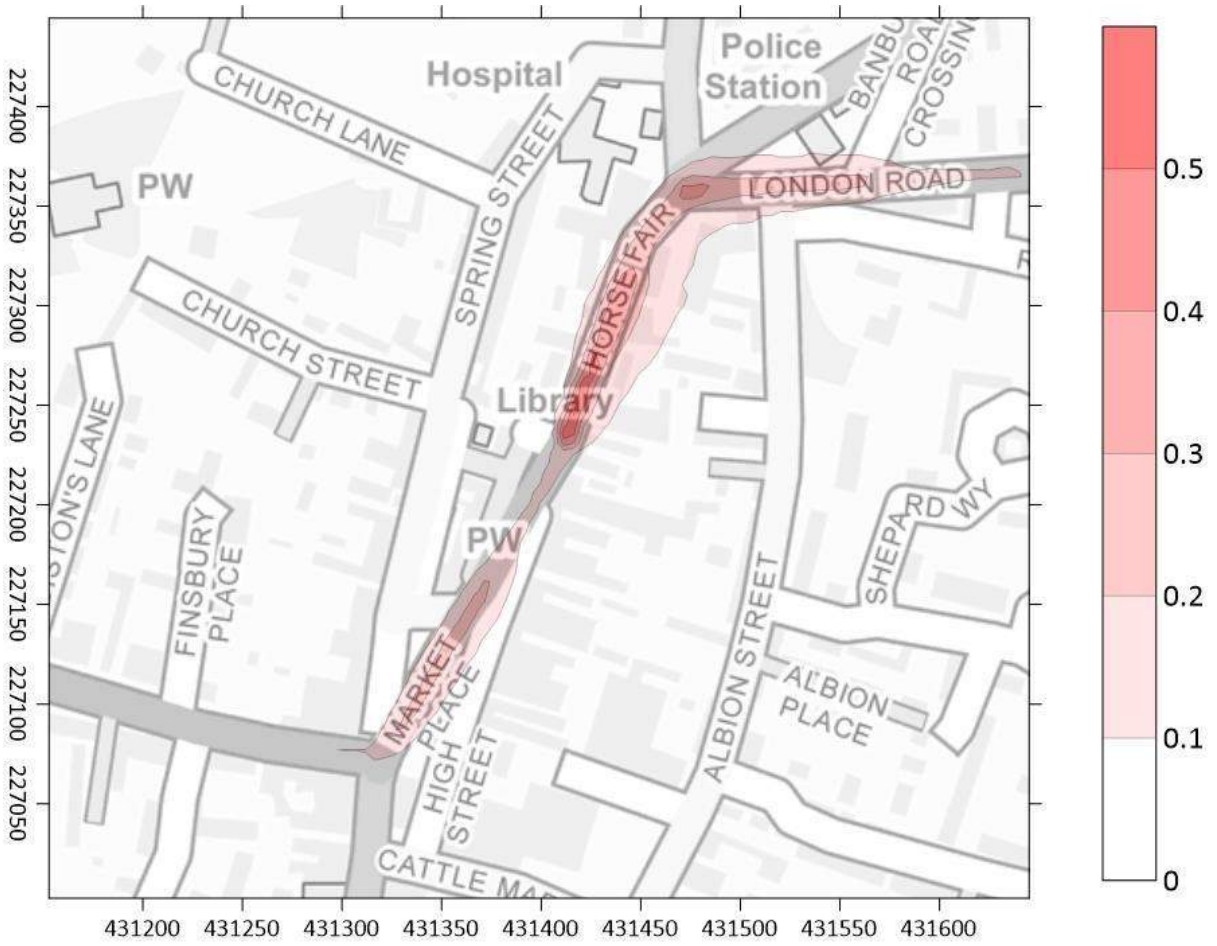


Figure 3.4 Annual Average Nitrogen Dioxide (µgm^{-3}) Contribution from Scenario 2 Across the Study Area



Particulate Matter (PM_{10})

Table 3.9 presents a summary of the predicted change in annual mean PM_{10} concentrations at relevant receptor locations, due to changes in traffic flow associated with the development, based on modelled 'do minimum' and 'do something' scenarios.

Table 3.9 Predicted Annual Average Concentrations of PM_{10} at Receptor Locations

Receptor		PM_{10} (µg/m^3)			
		Baseline 2019	Do Minimum 2031	Do Something 2031	Development Contribution
R1	1 London Road	16.42	16.52	16.55	0.03
R2	2 London Road	16.24	16.28	16.31	0.03
R3*	31 Horse Fair	17.28	17.40	17.44	0.04
R4*	18a Horse Fair	15.53	15.50	15.52	0.02
R5*	8 Horse Fair	15.13	15.13	15.14	0.02
R6*	15 Horse Fair	16.73	16.79	16.83	0.04

Receptor		PM_{10} (µg/m³)			
		Baseline 2019	Do Minimum 2031	Do Something 2031	Development Contribution
R7*	4 Horse Fair	16.71	16.68	16.72	0.04
R8*	31 High Street	22.09	22.60	22.71	0.11
R9*	26 High Street	14.98	15.04	15.06	0.02
R10*	24 High Street	15.01	15.09	15.10	0.02
R11*	1a Middle Row	14.73	14.76	14.78	0.01
R12*	6 New Street	15.59	15.63	15.65	0.02
R13	20 New Street	15.40	15.43	15.46	0.02
R14	35 New Street	15.96	16.11	16.14	0.03
Annual Mean AQO		**40 µg/m³**			
*Located within the AQMA					

All modelled existing receptors are predicted to be below the AQO for PM_{10} in both the 'do minimum' and 'do something' scenarios.

As indicated in Table 3.9, the maximum predicted increase in the annual average exposure to PM_{10} at any existing receptor, due to changes in traffic movements associated with the development, is 0.11 µg/m³ at 31 High Street (R8).

The impact description of changes in traffic flow associated with the development with respect to annual mean PM_{10} exposure has been assessed. The outcomes of the assessment are summarised in Table 3.10

Table 3.10 Impact Description of Effects at Key Receptors (PM_{10})

PM_{10} Impact Description of Effects at Key Receptors					
Recep.	Change Due to Development (DS-DM) (µg/m³)	% of AQO	% Change in Concentration Relative to AQO	% Annual Mean Concentration in Assessment Year	Impact Descriptor
R1	0.02	0.07	0%	≤75% of AQO	Negligible
R2	0.02	0.07	0%	≤75% of AQO	Negligible
R3*	0.02	0.09	0%	≤75% of AQO	Negligible
R4*	0.01	0.05	0%	≤75% of AQO	Negligible
R5*	0.01	0.04	0%	≤75% of AQO	Negligible
R6*	0.02	0.09	0%	≤75% of AQO	Negligible
R7*	0.02	0.09	0%	≤75% of AQO	Negligible
R8*	0.06	0.25	0%	≤75% of AQO	Negligible
R9*	0.01	0.04	0%	≤75% of AQO	Negligible
R10*	0.01	0.04	0%	≤75% of AQO	Negligible
R11*	0.01	0.03	0%	≤75% of AQO	Negligible
R12*	0.01	0.05	0%	≤75% of AQO	Negligible
R13	0.01	0.05	0%	≤75% of AQO	Negligible

PM_{10} Impact Description of Effects at Key Receptors					
Recep.	Change Due to Development (DS-DM) (µg/m³)	% of AQO	% Change in Concentration Relative to AQO	% Annual Mean Concentration in Assessment Year	Impact Descriptor
R14	0.02	0.07	0%	≤75% of AQO	Negligible
+0% means a change of <0.5% as per explanatory note 2 of table 6.3 of the EPUK IAQM Guidance.					
*Located within the AQMA					

The impact description of the effects of changes in traffic flow as a result of the proposed development, with respect to PM_{10} exposure for existing receptors, including those within the AQMA, is determined to be 'negligible' at all receptors.

Particulate Matter ($PM_{2.5}$)

Table 3.11 (below) presents a summary of the predicted change in annual mean $PM_{2.5}$ concentrations at relevant receptor locations, due to changes in traffic flow associated with the development, based on modelled 'do minimum' and 'do something' scenarios.

Table 3.11 Predicted Annual Average Concentrations of $PM_{2.5}$ at Receptor Locations

Receptor		$PM_{1.5}$ (µg/m³)			
		Baseline 2019	Do Minimum 2031	Do Something 2031	Development Contribution
R1	1 London Road	10.72	10.66	10.68	0.02
R2	2 London Road	10.61	10.52	10.54	0.02
R3*	31 Horse Fair	11.31	11.20	11.22	0.02
R4*	18a Horse Fair	10.18	10.07	10.08	0.01
R5*	8 Horse Fair	9.93	9.85	9.86	0.01
R6*	15 Horse Fair	10.99	10.86	10.88	0.02
R7*	4 Horse Fair	10.98	10.80	10.82	0.02
R8*	31 High Street	14.45	14.33	14.39	0.06
R9*	26 High Street	9.81	9.79	9.80	0.01
R10*	24 High Street	9.83	9.81	9.82	0.01
R11*	1a Middle Row	9.66	9.63	9.63	0.01
R12*	6 New Street	10.19	10.13	10.14	0.01
R13	20 New Street	10.06	10.01	10.02	0.01
R14	35 New Street	10.40	10.41	10.42	0.02
Annual Mean AQO		**25 µg/m³**			
*Located within the AQMA					

All modelled existing receptors are predicted to be below the AQO for $PM_{2.5}$ in both the 'do minimum' and 'do something' scenarios.

As indicated in Table 3.11, the maximum predicted increase in the annual average exposure to $PM_{2.5}$ at any existing receptor, due to changes in traffic movements associated with the development, is 0.06 µg/m^3 at 31 High Street (R8).

The impact description of changes in traffic flow associated with the development with respect to annual mean $PM_{2.5}$ exposure has been assessed. The outcomes of the assessment are summarised in Table 3.12 (below).

Table 3.12 Impact Description of Effects at Key Receptors ($PM_{2.5}$)

$PM_{2.5}$ Impact Description of Effects at Key Receptors					
Recep.	**Change Due to Development (DS-DM) (µg/m³)**	**% of AQO**	**% Change in Concentration Relative to AQO**	**% Annual Mean Concentration in Assessment Year**	**Impact Descriptor**
R1	0.02	0.07	0%	≤75% of AQO	Negligible
R2	0.02	0.07	0%	≤75% of AQO	Negligible
R3*	0.02	0.09	0%	≤75% of AQO	Negligible
R4*	0.01	0.05	0%	≤75% of AQO	Negligible
R5*	0.01	0.04	0%	≤75% of AQO	Negligible
R6*	0.02	0.09	0%	≤75% of AQO	Negligible
R7*	0.02	0.09	0%	≤75% of AQO	Negligible
R8*	0.06	0.25	0%	≤75% of AQO	Negligible
R9*	0.01	0.04	0%	≤75% of AQO	Negligible
R10*	0.01	0.04	0%	≤75% of AQO	Negligible
R11*	0.01	0.03	0%	≤75% of AQO	Negligible
R12*	0.01	0.05	0%	≤75% of AQO	Negligible
R13	0.01	0.05	0%	≤75% of AQO	Negligible
R14	0.02	0.07	0%	≤75% of AQO	Negligible
+0% means a change of <0.5% as per explanatory note 2 of table 6.3 of the EPUK IAQM Guidance.					
*Located within the AQMA					

The impact description of the effects of changes in traffic flow as a result of the proposed development, with respect to $PM_{2.5}$ exposure for existing receptors, including those within the AQMA, is determined to be 'negligible' at all receptors.

3.3 Scenario 3 - A361 Weight Limit

Table 3.13 (below) presents a summary of the predicted change in NO_2 concentrations at relevant receptor locations, due to changes in traffic flow associated with the development, based on modelled 'do minimum' and 'do something' scenarios.

Table 3.13 Predicted Annual Average Concentrations of NO_2 at Receptor Locations

Receptor		NO_2 (µg/m³)			
		Baseline 2019	Do Minimum 2031	Do Something 2031	Development Contribution
R1	1 London Road	35.98	22.65	22.39	-0.27
R2	2 London Road	34.79	21.98	21.72	-0.26
R3*	31 Horse Fair	45.16	26.50	26.01	-0.49
R4*	18a Horse Fair	31.36	20.57	20.33	-0.25
R5*	8 Horse Fair	28.65	19.66	19.39	-0.27
R6*	15 Horse Fair	44.05	26.29	25.63	-0.66
R7*	4 Horse Fair	44.46	26.17	25.47	-0.70
R8*	31 High Street	80.43	43.23	41.92	-1.31
R9*	26 High Street	24.92	18.32	18.20	-0.13
R10*	24 High Street	24.97	18.34	18.22	-0.12
R11*	1a Middle Row	23.42	17.72	17.60	-0.12
R12*	6 New Street	28.91	19.69	19.57	-0.12
R13	20 New Street	26.71	18.82	18.70	-0.12
R14	35 New Street	30.10	20.32	20.17	-0.15
Annual Mean AQO		**40 µg/m³**			
*Located within the AQMA					

All modelled existing receptors, including those located within the AQMA, are predicted to be below the AQO for NO_2 in both the 'do minimum' and 'do something' scenarios.

As indicated in Table 3.13, the minimum predicted decrease in the annual average exposure to NO_2 at any existing receptor, due to changes in traffic movements associated with the development, is -0.12 µg/m³ at 24 High Street (R10), 1a Middle Row (R11), 6 New Street (R12), and 20 New Street (R13). The maximum predicted decrease in the annual average exposure to NO_2 at any existing receptor, due to changes in traffic movements associated with the development, is -1.31 µg/m³ at 31 High Street (R8).

The impact description of changes in traffic flow associated with the development with respect to annual mean NO_2 exposure has been assessed. The outcomes of the assessment are summarised in Table 3.14 (below).

Table 3.14 Impact Description of Effects at Key Receptors (NO_2)

NO_2 Impact Description of Effects at Key Receptors					
Recep.	**Change Due to Development (DS-DM) (µg/m³)**	**% of AQO**	**% Change in Concentration Relative to AQO**	**% Annual Mean Concentration in Assessment Year**	**Impact Descriptor**
R1	-0.27	-0.67	0%	≤75% of AQO	Negligible
R2	-0.26	-0.64	0%	≤75% of AQO	Negligible
R3*	-0.49	-1.21	1%	≤75% of AQO	Negligible
R4*	-0.25	-0.62	1%	≤75% of AQO	Negligible
R5*	-0.27	-0.67	1%	≤75% of AQO	Negligible
R6*	-0.66	-1.66	1%	≤75% of AQO	Negligible
R7*	-0.70	-1.76	1%	≤75% of AQO	Negligible
R8*	-1.31	-3.27	2-5%	103-109% of AQO	Moderate
R9*	-0.13	-0.32	0%	≤75% of AQO	Negligible
R10*	-0.12	-0.30	0%	≤75% of AQO	Negligible
R11*	-0.12	-0.30	0%	≤75% of AQO	Negligible
R12*	-0.12	-0.30	0%	≤75% of AQO	Negligible
R13	-0.12	-0.30	0%	≤75% of AQO	Negligible
R14	-0.15	-0.37	0%	≤75% of AQO	Negligible
+0% means a change of <0.5% as per explanatory note 2 of table 6.3 of the EPUK IAQM Guidance.					
*Located within the AQMA					

The impact description of the effects of changes in traffic flow as a result of the proposed development, with respect to NO_2 exposure for existing receptors, is determined to be 'negligible' at all existing receptor locations, except R8 which is determined to be 'moderate'. Given the quantitative nature of the assessment and the verification of the air quality dispersion model, the confidence of the assessment is deemed to be 'high'.

Figure 3.5 Annual Average Nitrogen Dioxide (µgm^{-3}) Concentrations Across the Study Area

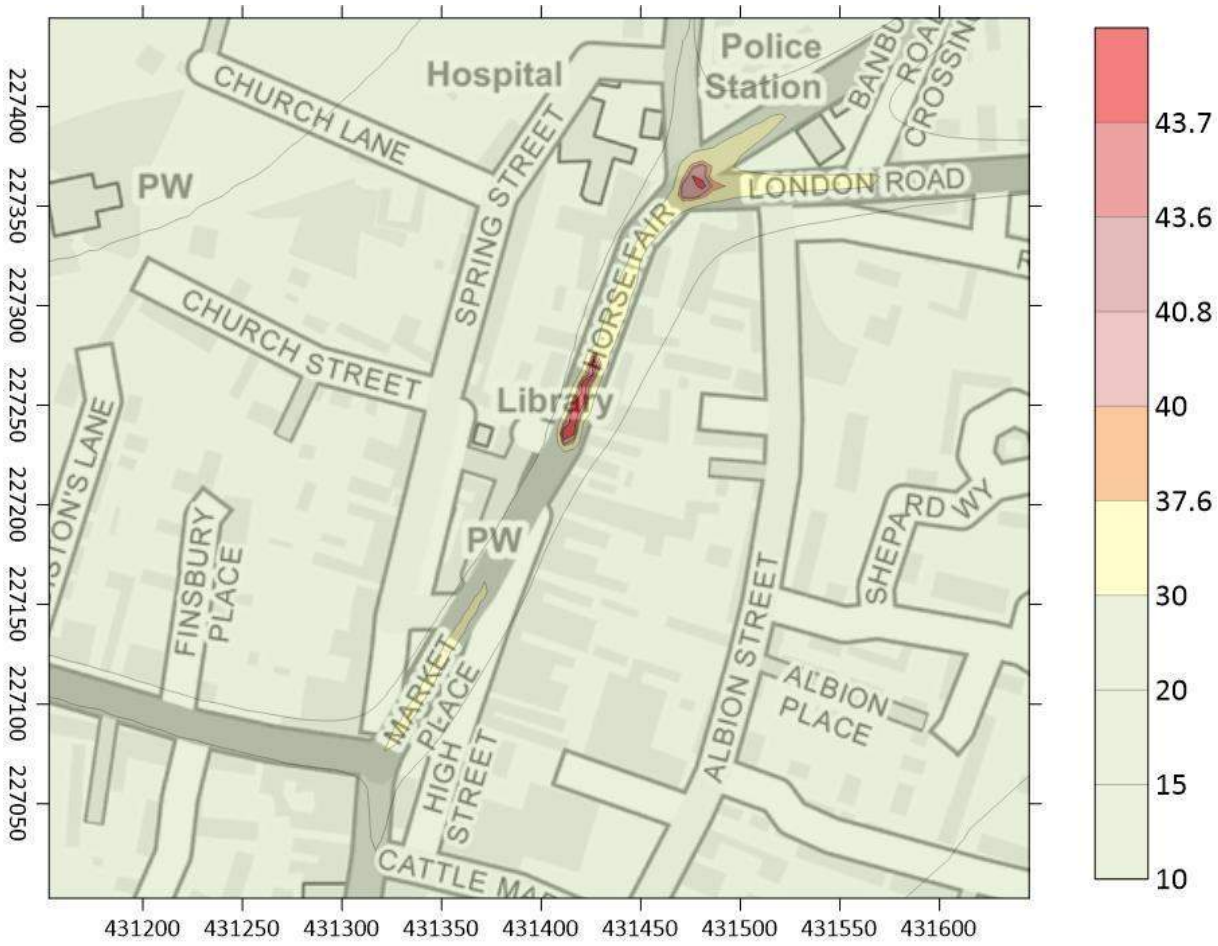


Figure 3.6 Annual Average Nitrogen Dioxide (µgm^{-3}) Contribution from Scenario 3 Across the Study Area

Particulate Matter (PM_{10})

Table 3.15 presents a summary of the predicted change in annual mean PM_{10} concentrations at relevant receptor locations, due to changes in traffic flow associated with the development, based on modelled 'do minimum' and 'do something' scenarios.

Table 3.15 Predicted Annual Average Concentrations of PM_{10} at Receptor Locations

Receptor		PM_{10} (µg/m^3)			
		Baseline 2019	Do Minimum 2031	Do Something 2031	Development Contribution
R1	1 London Road	16.42	16.52	16.42	-0.10
R2	2 London Road	16.24	16.28	16.18	-0.10
R3*	31 Horse Fair	17.28	17.40	17.27	-0.13
R4*	18a Horse Fair	15.53	15.50	15.44	-0.06
R5*	8 Horse Fair	15.13	15.13	15.07	-0.06
R6*	15 Horse Fair	16.73	16.79	16.67	-0.12

Receptor		PM_{10} (µg/m³)			
		Baseline 2019	Do Minimum 2031	Do Something 2031	Development Contribution
R7*	4 Horse Fair	16.71	16.68	16.56	-0.12
R8*	31 High Street	22.09	22.60	22.26	-0.34
R9*	26 High Street	14.98	15.04	14.99	-0.05
R10*	24 High Street	15.01	15.09	15.03	-0.06
R11*	1a Middle Row	14.73	14.76	14.72	-0.04
R12*	6 New Street	15.59	15.63	15.56	-0.07
R13	20 New Street	15.40	15.43	15.36	-0.07
R14	35 New Street	15.96	16.11	16.01	-0.10
Annual Mean AQO		**40 µg/m³**			
*Located within the AQMA					

All modelled existing receptors are predicted to be below the AQO for PM_{10} in both the 'do minimum' and 'do something' scenarios.

As indicated in Table 3.15, the minimum predicted decrease in the annual average exposure to PM_{10} at any existing receptor, due to changes in traffic movements associated with the development, is -0.04 µg/m³ at 1a Middle Row (R11). The maximum predicted decrease in the annual average exposure to PM_{10} at any existing receptor, due to changes in traffic movements associated with the development, is -0.34 µg/m³ at 31 High Street (R8).

The impact description of changes in traffic flow associated with the development with respect to annual mean PM_{10} exposure has been assessed. The outcomes of the assessment are summarised in Table 3.16.

Table 3.16 Impact Description of Effects at Key Receptors (PM_{10})

PM_{10} Impact Description of Effects at Key Receptors					
Recep.	Change Due to Development (DS-DM) (µg/m³)	% of AQO	% Change in Concentration Relative to AQO	% Annual Mean Concentration in Assessment Year	Impact Descriptor
R1	-0.10	-0.24	0%	≤75% of AQO	Negligible
R2	-0.10	-0.24	0%	≤75% of AQO	Negligible
R3*	-0.13	-0.33	0%	≤75% of AQO	Negligible
R4*	-0.06	-0.16	0%	≤75% of AQO	Negligible
R5*	-0.06	-0.14	0%	≤75% of AQO	Negligible
R6*	-0.12	-0.30	0%	≤75% of AQO	Negligible
R7*	-0.12	-0.30	0%	≤75% of AQO	Negligible
R8*	-0.34	-0.85	1%	≤75% of AQO	Negligible
R9*	-0.05	-0.13	0%	≤75% of AQO	Negligible

PM_{10} Impact Description of Effects at Key Receptors					
Recep.	Change Due to Development (DS-DM) (µg/m³)	% of AQO	% Change in Concentration Relative to AQO	% Annual Mean Concentration in Assessment Year	Impact Descriptor
R10*	-0.06	-0.14	0%	≤75% of AQO	Negligible
R11*	-0.04	-0.11	0%	≤75% of AQO	Negligible
R12*	-0.07	-0.17	0%	≤75% of AQO	Negligible
R13	-0.07	-0.18	0%	≤75% of AQO	Negligible
R14	-0.10	-0.24	0%	≤75% of AQO	Negligible
+0% means a change of <0.5% as per explanatory note 2 of table 6.3 of the EPUK IAQM Guidance.					
*Located within the AQMA					

The impact description of the effects of changes in traffic flow as a result of the proposed development, with respect to PM_{10} exposure for existing receptors, including those within the AQMA, is determined to be 'negligible' at all receptors.

Particulate Matter ($PM_{2.5}$)

Table 3.17 (below) presents a summary of the predicted change in annual mean $PM_{2.5}$ concentrations at relevant receptor locations, due to changes in traffic flow associated with the development, based on modelled 'do minimum' and 'do something' scenarios.

Table 3.17 Predicted Annual Average Concentrations of $PM_{2.5}$ at Receptor Locations

Receptor		$PM_{1.5}$ (µg/m³)			
		Baseline 2019	Do Minimum 2031	Do Something 2031	Development Contribution
R1	1 London Road	10.72	10.66	10.61	-0.06
R2	2 London Road	10.61	10.52	10.46	-0.06
R3*	31 Horse Fair	11.31	11.20	11.12	-0.08
R4*	18a Horse Fair	10.18	10.07	10.04	-0.04
R5*	8 Horse Fair	9.93	9.85	9.82	-0.03
R6*	15 Horse Fair	10.99	10.86	10.79	-0.07
R7*	4 Horse Fair	10.98	10.80	10.72	-0.07
R8*	31 High Street	14.45	14.33	14.12	-0.20
R9*	26 High Street	9.81	9.79	9.76	-0.03
R10*	24 High Street	9.83	9.81	9.78	-0.03
R11*	1a Middle Row	9.66	9.63	9.60	-0.02
R12*	6 New Street	10.19	10.13	10.09	-0.04
R13	20 New Street	10.06	10.01	9.97	-0.04
R14	35 New Street	10.40	10.41	10.35	-0.06
Annual Mean AQO		**25 µg/m³**			
*Located within the AQMA					

All modelled existing receptors are predicted to be below the AQO for $PM_{2.5}$ in both the 'do minimum' and 'do something' scenarios.

As indicated in Table 3.17, the minimum predicted decrease in the annual average exposure to $PM_{2.5}$ at any existing receptor, due to changes in traffic movements associated with the development, is -0.02 µg/m^3 at 1a Middle Row (R11). The maximum predicted decrease in the annual average exposure to $PM_{2.5}$ at any existing receptor, due to changes in traffic movements associated with the development, is -0.20 µg/m^3 at 31 High Street (R8).

The impact description of changes in traffic flow associated with the development with respect to annual mean $PM_{2.5}$ exposure has been assessed. The outcomes of the assessment are summarised in Table 3.18 (below).

Table 3.18 Impact Description of Effects at Key Receptors ($PM_{2.5}$)

$PM_{2.5}$ Impact Description of Effects at Key Receptors					
Recep.	**Change Due to Development (DS-DM) (µg/m³)**	**% of AQO**	**% Change in Concentration Relative to AQO**	**% Annual Mean Concentration in Assessment Year**	**Impact Descriptor**
R1	-0.06	-0.22	0%	≤75% of AQO	Negligible
R2	-0.06	-0.22	0%	≤75% of AQO	Negligible
R3*	-0.08	-0.30	0%	≤75% of AQO	Negligible
R4*	-0.04	-0.15	0%	≤75% of AQO	Negligible
R5*	-0.03	-0.13	0%	≤75% of AQO	Negligible
R6*	-0.07	-0.28	0%	≤75% of AQO	Negligible
R7*	-0.07	-0.29	0%	≤75% of AQO	Negligible
R8*	-0.20	-0.80	1%	≤75% of AQO	Negligible
R9*	-0.03	-0.12	0%	≤75% of AQO	Negligible
R10*	-0.03	-0.13	0%	≤75% of AQO	Negligible
R11*	-0.02	-0.10	0%	≤75% of AQO	Negligible
R12*	-0.04	-0.15	0%	≤75% of AQO	Negligible
R13	-0.04	-0.16	0%	≤75% of AQO	Negligible
R14	-0.06	-0.22	0%	≤75% of AQO	Negligible
+0% means a change of <0.5% as per explanatory note 2 of table 6.3 of the EPUK IAQM Guidance.					
*Located within the AQMA					

The impact description of the effects of changes in traffic flow as a result of the proposed development, with respect to $PM_{2.5}$ exposure for existing receptors, including those within the AQMA, is determined to be 'negligible' at all receptors.

3.4 Scenario 4 - A361 & A3400 Weight Limit

Table 3.19 (below) presents a summary of the predicted change in NO_2 concentrations at relevant receptor locations, due to changes in traffic flow associated with the development, based on modelled 'do minimum' and 'do something' scenarios.

Table 3.19 Predicted Annual Average Concentrations of NO2 at Receptor Locations

Receptor		NO_2 (µg/m³)			
		Baseline 2019	Do Minimum 2031	Do Something 2031	Development Contribution
R1	1 London Road	35.98	22.65	22.39	-0.27
R2	2 London Road	34.79	21.98	21.72	-0.26
R3*	31 Horse Fair	45.16	26.50	26.01	-0.49
R4*	18a Horse Fair	31.36	20.57	20.33	-0.25
R5*	8 Horse Fair	28.65	19.66	19.39	-0.27
R6*	15 Horse Fair	44.05	26.29	25.63	-0.66
R7*	4 Horse Fair	44.46	26.17	25.47	-0.70
R8*	31 High Street	80.43	43.23	41.92	-1.31
R9*	26 High Street	24.92	18.32	18.20	-0.13
R10*	24 High Street	24.97	18.34	18.22	-0.12
R11*	1a Middle Row	23.42	17.72	17.60	-0.12
R12*	6 New Street	28.91	19.69	19.57	-0.12
R13	20 New Street	26.71	18.82	18.70	-0.12
R14	35 New Street	30.10	20.32	20.17	-0.15
Annual Mean AQO		**40 µg/m³**			
*Located within the AQMA					

All modelled existing receptors, including those located within the AQMA, are predicted to be below the AQO for NO_2 in both the 'do minimum' and 'do something' scenarios.

As indicated in Table 3.19, the minimum predicted decrease in the annual average exposure to NO_2 at any existing receptor, due to changes in traffic movements associated with the development, is -0.12 µg/m³ at 24 High Street (R10), 1a Middle Row (R11), 6 New Street (R12), and 20 New Street (R13). The maximum predicted decrease in the annual average exposure to NO_2 at any existing receptor, due to changes in traffic movements associated with the development, is -1.31 µg/m³ at 31 High Street (R8).

The impact description of changes in traffic flow associated with the development with respect to annual mean NO_2 exposure has been assessed. The outcomes of the assessment are summarised in Table 3.20 (below).

Table 3.20 Impact Description of Effects at Key Receptors (NO_2)

NO_2 Impact Description of Effects at Key Receptors					
Recep.	**Change Due to Development (DS-DM) (µg/m³)**	**% of AQO**	**% Change in Concentration Relative to AQO**	**% Annual Mean Concentration in Assessment Year**	**Impact Descriptor**
R1	-0.27	-0.67	1%	≤75% of AQO	Negligible
R2	-0.26	-0.64	1%	≤75% of AQO	Negligible
R3*	-0.49	-1.21	1%	≤75% of AQO	Negligible
R4*	-0.25	-0.62	1%	≤75% of AQO	Negligible
R5*	-0.27	-0.67	1%	≤75% of AQO	Negligible
R6*	-0.66	-1.66	2-5%	≤75% of AQO	Negligible
R7*	-0.70	-1.76	2-5%	≤75% of AQO	Negligible
R8*	-1.31	-3.27	2-5%	103-109% of AQO	Moderate
R9*	-0.13	-0.32	0%	≤75% of AQO	Negligible
R10*	-0.12	-0.30	0%	≤75% of AQO	Negligible
R11*	-0.12	-0.30	0%	≤75% of AQO	Negligible
R12*	-0.12	-0.30	0%	≤75% of AQO	Negligible
R13	-0.12	-0.30	0%	≤75% of AQO	Negligible
R14	-0.15	-0.37	0%	≤75% of AQO	Negligible
+0% means a change of <0.5% as per explanatory note 2 of table 6.3 of the EPUK IAQM Guidance.					
*Located within the AQMA					

The impact description of the effects of changes in traffic flow as a result of the proposed development, with respect to NO_2 exposure for existing receptors, is determined to be 'negligible' at all existing receptor locations, except R8 which is determined to be 'moderate'. Given the quantitative nature of the assessment and the verification of the air quality dispersion model, the confidence of the assessment is deemed to be 'high'.

Figure 3.7 Annual Average Nitrogen Dioxide (µgm^{-3}) Concentrations Across the Study Area

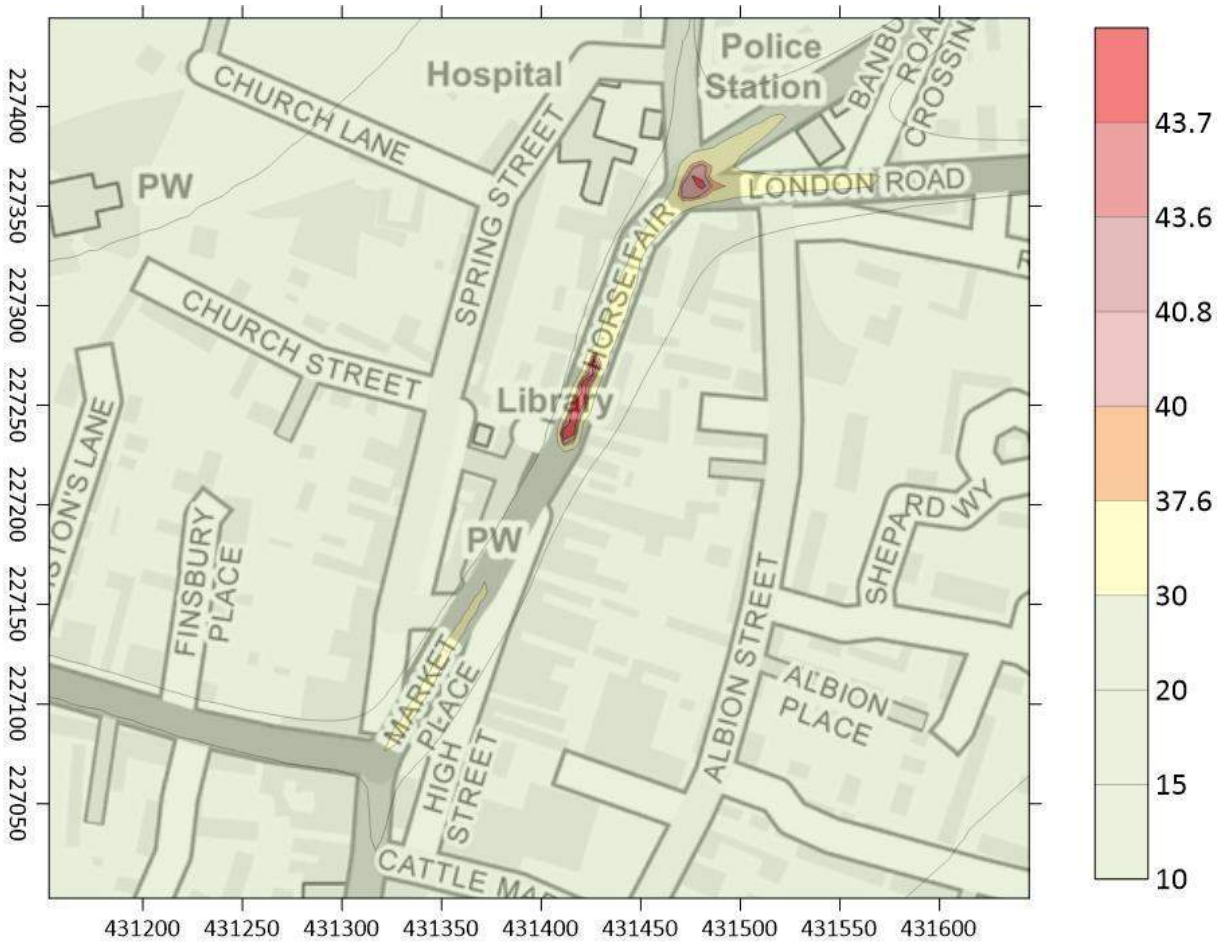


Figure 3.8 Annual Average Nitrogen Dioxide (µgm^{-3}) Contribution from Scenario 4 Across the Study Area

Particulate Matter (PM_{10})

Table 3.21 presents a summary of the predicted change in annual mean PM_{10} concentrations at relevant receptor locations, due to changes in traffic flow associated with the development, based on modelled 'do minimum' and 'do something' scenarios.

Table 3.21 Predicted Annual Average Concentrations of PM_{10} at Receptor Locations

Receptor		PM_{10} (µg/m^3)			
		Baseline 2019	Do Minimum 2031	Do Something 2031	Development Contribution
R1	1 London Road	16.42	16.52	16.42	-0.10
R2	2 London Road	16.24	16.28	16.18	-0.10
R3*	31 Horse Fair	17.28	17.40	17.27	-0.13
R4*	18a Horse Fair	15.53	15.50	15.44	-0.06
R5*	8 Horse Fair	15.13	15.13	15.07	-0.06
R6*	15 Horse Fair	16.73	16.79	16.67	-0.12

Receptor		PM_{10} (µg/m³)			
		Baseline 2019	Do Minimum 2031	Do Something 2031	Development Contribution
R7*	4 Horse Fair	16.71	16.68	16.56	-0.12
R8*	31 High Street	22.09	22.60	22.26	-0.34
R9*	26 High Street	14.98	15.04	14.99	-0.05
R10*	24 High Street	15.01	15.09	15.03	-0.06
R11*	1a Middle Row	14.73	14.76	14.72	-0.04
R12*	6 New Street	15.59	15.63	15.56	-0.07
R13	20 New Street	15.40	15.43	15.36	-0.07
R14	35 New Street	15.96	16.11	16.01	-0.10
Annual Mean AQO		**40 µg/m³**			
*Located within the AQMA					

All modelled existing receptors are predicted to be below the AQO for PM_{10} in both the 'do minimum' and 'do something' scenarios.

As indicated in Table 3.3, the minimum predicted decrease in the annual average exposure to PM_{10} at any existing receptor, due to changes in traffic movements associated with the development, is -0.04 µg/m³ at 1a Middle Row (R11). The maximum predicted decrease in the annual average exposure to PM_{10} at any existing receptor, due to changes in traffic movements associated with the development, is -0.34 µg/m³ at 31 High Street (R8).

The impact description of changes in traffic flow associated with the development with respect to annual mean PM_{10} exposure has been assessed. The outcomes of the assessment are summarised in Table 3.22.

Table 3.22 Impact Description of Effects at Key Receptors (PM_{10})

PM_{10} Impact Description of Effects at Key Receptors					
Recep.	Change Due to Development (DS-DM) (µg/m³)	% of AQO	% Change in Concentration Relative to AQO	% Annual Mean Concentration in Assessment Year	Impact Descriptor
R1	-0.10	-0.24	0%	≤75% of AQO	Negligible
R2	-0.10	-0.24	0%	≤75% of AQO	Negligible
R3*	-0.13	-0.33	0%	≤75% of AQO	Negligible
R4*	-0.06	-0.16	0%	≤75% of AQO	Negligible
R5*	-0.06	-0.14	0%	≤75% of AQO	Negligible
R6*	-0.12	-0.30	0%	≤75% of AQO	Negligible
R7*	-0.12	-0.30	0%	≤75% of AQO	Negligible
R8*	-0.34	-0.85	1%	≤75% of AQO	Negligible
R9*	-0.05	-0.13	0%	≤75% of AQO	Negligible
R10*	-0.06	-0.14	0%	≤75% of AQO	Negligible

PM_{10} Impact Description of Effects at Key Receptors					
Recep.	Change Due to Development (DS-DM) (µg/m³)	% of AQO	% Change in Concentration Relative to AQO	% Annual Mean Concentration in Assessment Year	Impact Descriptor
R11*	-0.04	-0.11	0%	≤75% of AQO	Negligible
R12*	-0.07	-0.17	0%	≤75% of AQO	Negligible
R13	-0.07	-0.18	0%	≤75% of AQO	Negligible
R14	-0.10	-0.24	0%	≤75% of AQO	Negligible
+0% means a change of <0.5% as per explanatory note 2 of table 6.3 of the EPUK IAQM Guidance.					
*Located within the AQMA					

The impact description of the effects of changes in traffic flow as a result of the proposed development, with respect to PM_{10} exposure for existing receptors, including those within the AQMA, is determined to be 'negligible' at all receptors.

Particulate Matter ($PM_{2.5}$)

Table 3.23 (below) presents a summary of the predicted change in annual mean $PM_{2.5}$ concentrations at relevant receptor locations, due to changes in traffic flow associated with the development, based on modelled 'do minimum' and 'do something' scenarios.

Table 3.23 Predicted Annual Average Concentrations of $PM_{2.5}$ at Receptor Locations

Receptor		$PM_{1.5}$ (µg/m³)			
		Baseline 2019	Do Minimum 2031	Do Something 2031	Development Contribution
R1	1 London Road	10.72	10.66	10.61	-0.06
R2	2 London Road	10.61	10.52	10.46	-0.06
R3*	31 Horse Fair	11.31	11.20	11.12	-0.08
R4*	18a Horse Fair	10.18	10.07	10.04	-0.04
R5*	8 Horse Fair	9.93	9.85	9.82	-0.03
R6*	15 Horse Fair	10.99	10.86	10.79	-0.07
R7*	4 Horse Fair	10.98	10.80	10.72	-0.07
R8*	31 High Street	14.45	14.33	14.12	-0.20
R9*	26 High Street	9.81	9.79	9.76	-0.03
R10*	24 High Street	9.83	9.81	9.78	-0.03
R11*	1a Middle Row	9.66	9.63	9.60	-0.02
R12*	6 New Street	10.19	10.13	10.09	-0.04
R13	20 New Street	10.06	10.01	9.97	-0.04
R14	35 New Street	10.40	10.41	10.35	-0.06
Annual Mean AQO		**25 µg/m³**			
*Located within the AQMA					

All modelled existing receptors are predicted to be below the AQO for $PM_{2.5}$ in both the 'do minimum' and 'do something' scenarios.

As indicated in Table 3.23, the minimum predicted decrease in the annual average exposure to $PM_{2.5}$ at any existing receptor, due to changes in traffic movements associated with the development, is -0.02 µg/m^3 at 1a Middle Row (R11). The maximum predicted decrease in the annual average exposure to $PM_{2.5}$ at any existing receptor, due to changes in traffic movements associated with the development, is -0.20 µg/m^3 at 31 High Street (R8).

The impact description of changes in traffic flow associated with the development with respect to annual mean $PM_{2.5}$ exposure has been assessed. The outcomes of the assessment are summarised in Table 3.24 (below).

Table 3.24 Impact Description of Effects at Key Receptors ($PM_{2.5}$)

$PM_{2.5}$ Impact Description of Effects at Key Receptors					
Recep.	**Change Due to Development (DS-DM) (µg/m³)**	**% of AQO**	**% Change in Concentration Relative to AQO**	**% Annual Mean Concentration in Assessment Year**	**Impact Descriptor**
R1	-0.06	-0.22	0%	≤75% of AQO	Negligible
R2	-0.06	-0.22	0%	≤75% of AQO	Negligible
R3*	-0.08	-0.30	0%	≤75% of AQO	Negligible
R4*	-0.04	-0.15	0%	≤75% of AQO	Negligible
R5*	-0.03	-0.13	0%	≤75% of AQO	Negligible
R6*	-0.07	-0.28	0%	≤75% of AQO	Negligible
R7*	-0.07	-0.29	0%	≤75% of AQO	Negligible
R8*	-0.20	-0.80	1%	≤75% of AQO	Negligible
R9*	-0.03	-0.12	0%	≤75% of AQO	Negligible
R10*	-0.03	-0.13	0%	≤75% of AQO	Negligible
R11*	-0.02	-0.10	0%	≤75% of AQO	Negligible
R12*	-0.04	-0.15	0%	≤75% of AQO	Negligible
R13	-0.04	-0.16	0%	≤75% of AQO	Negligible
R14	-0.06	-0.22	0%	≤75% of AQO	Negligible
+0% means a change of <0.5% as per explanatory note 2 of table 6.3 of the EPUK IAQM Guidance.					
*Located within the AQMA					

The impact description of the effects of changes in traffic flow as a result of the proposed development, with respect to $PM_{2.5}$ exposure for existing receptors, including those within the AQMA, is determined to be 'negligible' at all receptors.

3.5 Scenario 5 - Eastern Development Spine Road Option

Table 3.25 (below) presents a summary of the predicted change in NO_2 concentrations at relevant receptor locations, due to changes in traffic flow associated with the development, based on modelled 'do minimum' and 'do something' scenarios.

Table 3.25 Predicted Annual Average Concentrations of NO_2 at Receptor Locations

Receptor		NO_2 (µg/m³)			
		Baseline 2019	Do Minimum 2031	Do Something 2031	Development Contribution
R1	1 London Road	35.98	22.65	22.07	-0.58
R2	2 London Road	34.79	21.98	21.41	-0.57
R3*	31 Horse Fair	45.16	26.50	25.58	-0.92
R4*	18a Horse Fair	31.36	20.57	20.11	-0.47
R5*	8 Horse Fair	28.65	19.66	19.21	-0.46
R6*	15 Horse Fair	44.05	26.29	25.23	-1.06
R7*	4 Horse Fair	44.46	26.17	25.07	-1.10
R8*	31 High Street	80.43	43.23	40.93	-2.30
R9*	26 High Street	24.92	18.32	18.02	-0.31
R10*	24 High Street	24.97	18.34	18.04	-0.31
R11*	1a Middle Row	23.42	17.72	17.45	-0.27
R12*	6 New Street	28.91	19.69	19.35	-0.34
R13	20 New Street	26.71	18.82	18.47	-0.35
R14	35 New Street	30.10	20.32	19.86	-0.46
Annual Mean AQO		**40 µg/m³**			
*Located within the AQMA					

All modelled existing receptors, including those located within the AQMA, are predicted to be below the AQO for NO_2 in both the 'do minimum' and 'do something' scenarios.

As indicated in Table 3.25, the minimum predicted decrease in the annual average exposure to NO_2 at any existing receptor, due to changes in traffic movements associated with the development, is -0.27 µg/m³ at 1a Middle Row (R11). The maximum predicted decrease in the annual average exposure to NO_2 at any existing receptor, due to changes in traffic movements associated with the development, is -2.30 µg/m³ at 31 High Street (R8).

The impact description of changes in traffic flow associated with the development with respect to annual mean NO_2 exposure has been assessed. The outcomes of the assessment are summarised in Table 3.26 (below).

Table 3.26 Impact Description of Effects at Key Receptors (NO_2)

NO_2 Impact Description of Effects at Key Receptors					
Recep.	Change Due to Development (DS-DM) (µg/m³)	% of AQO	% Change in Concentration Relative to AQO	% Annual Mean Concentration in Assessment Year	Impact Descriptor
R1	-0.58	-1.46	1%	≤75% of AQO	Negligible
R2	-0.57	-1.44	1%	≤75% of AQO	Negligible
R3*	-0.92	-2.30	1%	≤75% of AQO	Negligible
R4*	-0.47	-1.16	0%	≤75% of AQO	Negligible
R5*	-0.46	-1.14	0%	≤75% of AQO	Negligible
R6*	-1.06	-2.65	1%	≤75% of AQO	Negligible
R7*	-1.10	-2.75	1%	≤75% of AQO	Negligible
R8*	-2.30	-5.75	2-5%	95-102% of AQO	Moderate
R9*	-0.31	-0.77	1%	≤75% of AQO	Negligible
R10*	-0.31	-0.77	1%	≤75% of AQO	Negligible
R11*	-0.27	-0.67	1%	≤75% of AQO	Negligible
R12*	-0.34	-0.84	1%	≤75% of AQO	Negligible
R13	-0.35	-0.87	1%	≤75% of AQO	Negligible
R14	-0.46	-1.14	1%	≤75% of AQO	Negligible
+0% means a change of <0.5% as per explanatory note 2 of table 6.3 of the EPUK IAQM Guidance.					
*Located within the AQMA					

The impact description of the effects of changes in traffic flow as a result of the proposed development, with respect to NO_2 exposure for existing receptors, is determined to be 'negligible' at all existing receptor locations, except R8 which is determined to be 'moderate'. Given the quantitative nature of the assessment and the verification of the air quality dispersion model, the confidence of the assessment is deemed to be 'high'.

Figure 3.9 Annual Average Nitrogen Dioxide (µgm^{-3}) Concentrations Across the Study Area

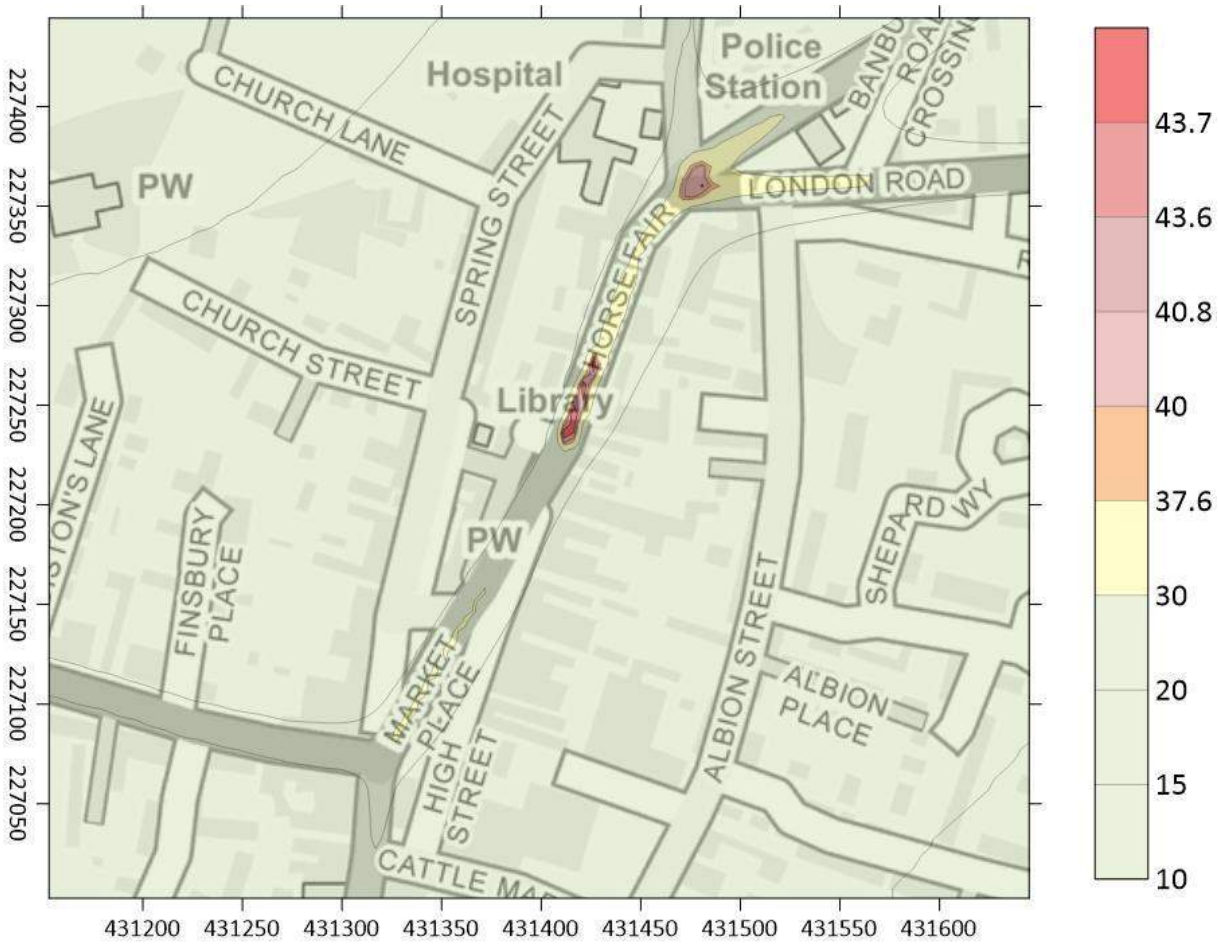


Figure 3.10 Annual Average Nitrogen Dioxide (µgm^{-3}) Contribution from Scenario 5 Across the Study Area

Particulate Matter (PM_{10})

Table 3.27 presents a summary of the predicted change in annual mean PM_{10} concentrations at relevant receptor locations, due to changes in traffic flow associated with the development, based on modelled 'do minimum' and 'do something' scenarios.

Table 3.27 Predicted Annual Average Concentrations of PM_{10} at Receptor Locations

Receptor		PM_{10} (µg/m^3)			
		Baseline 2019	Do Minimum 2031	Do Something 2031	Development Contribution
R1	1 London Road	16.42	16.52	16.31	-0.22
R2	2 London Road	16.24	16.28	16.07	-0.21
R3*	31 Horse Fair	17.28	17.40	17.11	-0.29
R4*	18a Horse Fair	15.53	15.50	15.36	-0.14

Receptor		PM_{10} (µg/m³)			
		Baseline 2019	Do Minimum 2031	Do Something 2031	Development Contribution
R5*	8 Horse Fair	15.13	15.13	15.00	-0.12
R6*	15 Horse Fair	16.73	16.79	16.53	-0.26
R7*	4 Horse Fair	16.71	16.68	16.42	-0.26
R8*	31 High Street	22.09	22.60	21.84	-0.76
R9*	26 High Street	14.98	15.04	14.93	-0.12
R10*	24 High Street	15.01	15.09	14.96	-0.12
R11*	1a Middle Row	14.73	14.76	14.67	-0.09
R12*	6 New Street	15.59	15.63	15.48	-0.15
R13	20 New Street	15.40	15.43	15.27	-0.16
R14	35 New Street	15.96	16.11	15.90	-0.22
Annual Mean AQO		**40 µg/m³**			
*Located within the AQMA					

All modelled existing receptors are predicted to be below the AQO for PM_{10} in both the 'do minimum' and 'do something' scenarios.

As indicated in Table 3.27, the minimum predicted decrease in the annual average exposure to PM_{10} at any existing receptor, due to changes in traffic movements associated with the development, is -0.09 µg/m³ at 1a Middle Row (R11). The maximum predicted decrease in the annual average exposure to PM_{10} at any existing receptor, due to changes in traffic movements associated with the development, is -0.76 µg/m³ at 31 High Street (R8).

The impact description of changes in traffic flow associated with the development with respect to annual mean PM_{10} exposure has been assessed. The outcomes of the assessment are summarised in Table 3.28.

Table 3.28 Impact Description of Effects at Key Receptors (PM_{10})

PM_{10} Impact Description of Effects at Key Receptors					
Recep.	Change Due to Development (DS-DM) (µg/m³)	% of AQO	% Change in Concentration Relative to AQO	% Annual Mean Concentration in Assessment Year	Impact Descriptor
R1	-0.22	-0.54	1%	≤75% of AQO	Negligible
R2	-0.21	-0.53	1%	≤75% of AQO	Negligible
R3*	-0.29	-0.72	1%	≤75% of AQO	Negligible
R4*	-0.14	-0.35	0%	≤75% of AQO	Negligible
R5*	-0.12	-0.30	0%	≤75% of AQO	Negligible
R6*	-0.26	-0.66	1%	≤75% of AQO	Negligible
R7*	-0.26	-0.66	1%	≤75% of AQO	Negligible
R8*	-0.76	-1.90	2-5%	≤75% of AQO	Negligible

PM_{10} Impact Description of Effects at Key Receptors					
Recep.	Change Due to Development (DS-DM) (µg/m³)	% of AQO	% Change in Concentration Relative to AQO	% Annual Mean Concentration in Assessment Year	Impact Descriptor
R9*	-0.12	-0.30	0%	≤75% of AQO	Negligible
R10*	-0.12	-0.31	0%	≤75% of AQO	Negligible
R11*	-0.09	-0.24	0%	≤75% of AQO	Negligible
R12*	-0.15	-0.37	0%	≤75% of AQO	Negligible
R13	-0.16	-0.40	0%	≤75% of AQO	Negligible
R14	-0.22	-0.54	1%	≤75% of AQO	Negligible
+0% means a change of <0.5% as per explanatory note 2 of table 6.3 of the EPUK IAQM Guidance.					
*Located within the AQMA					

The impact description of the effects of changes in traffic flow as a result of the proposed development, with respect to PM_{10} exposure for existing receptors, including those within the AQMA, is determined to be 'negligible' at all receptors.

Particulate Matter ($PM_{2.5}$)

Table 3.29 (below) presents a summary of the predicted change in annual mean $PM_{2.5}$ concentrations at relevant receptor locations, due to changes in traffic flow associated with the development, based on modelled 'do minimum' and 'do something' scenarios.

Table 3.29 Predicted Annual Average Concentrations of $PM_{2.5}$ at Receptor Locations

Receptor		$PM_{1.5}$ (µg/m³)			
		Baseline 2019	Do Minimum 2031	Do Something 2031	Development Contribution
R1	1 London Road	10.72	10.66	10.54	-0.13
R2	2 London Road	10.61	10.52	10.40	-0.12
R3*	31 Horse Fair	11.31	11.20	11.03	-0.17
R4*	18a Horse Fair	10.18	10.07	9.99	-0.08
R5*	8 Horse Fair	9.93	9.85	9.78	-0.07
R6*	15 Horse Fair	10.99	10.86	10.70	-0.16
R7*	4 Horse Fair	10.98	10.80	10.64	-0.16
R8*	31 High Street	14.45	14.33	13.87	-0.45
R9*	26 High Street	9.81	9.79	9.72	-0.07
R10*	24 High Street	9.83	9.81	9.74	-0.07
R11*	1a Middle Row	9.66	9.63	9.57	-0.06
R12*	6 New Street	10.19	10.13	10.04	-0.09
R13	20 New Street	10.06	10.01	9.92	-0.09
R14	35 New Street	10.40	10.41	10.28	-0.12
Annual Mean AQO		**25 µg/m³**			

Receptor	$PM_{1.5}$ (µg/m³)			
	Baseline 2019	Do Minimum 2031	Do Something 2031	Development Contribution
*Located within the AQMA				

All modelled existing receptors are predicted to be below the AQO for $PM_{2.5}$ in both the 'do minimum' and 'do something' scenarios.

As indicated in Table 3.29, the minimum predicted decrease in the annual average exposure to $PM_{2.5}$ at any existing receptor, due to changes in traffic movements associated with the development, is -0.06 µg/m³ at 1a Middle Row (R11). The maximum predicted decrease in the annual average exposure to $PM_{2.5}$ at any existing receptor, due to changes in traffic movements associated with the development, is -0.45 µg/m³ at 31 High Street (R8).

The impact description of changes in traffic flow associated with the development with respect to annual mean $PM_{2.5}$ exposure has been assessed. The outcomes of the assessment are summarised in Table 3.30 (below).

Table 3.30 Impact Description of Effects at Key Receptors ($PM_{2.5}$)

$PM_{2.5}$ Impact Description of Effects at Key Receptors					
Recep.	Change Due to Development (DS-DM) (µg/m³)	% of AQO	% Change in Concentration Relative to AQO	% Annual Mean Concentration in Assessment Year	Impact Descriptor
R1	-0.13	-0.51	1%	≤75% of AQO	Negligible
R2	-0.12	-0.50	1%	≤75% of AQO	Negligible
R3*	-0.17	-0.68	1%	≤75% of AQO	Negligible
R4*	-0.08	-0.33	0%	≤75% of AQO	Negligible
R5*	-0.07	-0.29	0%	≤75% of AQO	Negligible
R6*	-0.16	-0.63	1%	≤75% of AQO	Negligible
R7*	-0.16	-0.64	1%	≤75% of AQO	Negligible
R8*	-0.45	-1.81	2-5%	≤75% of AQO	Negligible
R9*	-0.07	-0.28	0%	≤75% of AQO	Negligible
R10*	-0.07	-0.28	0%	≤75% of AQO	Negligible
R11*	-0.06	-0.22	0%	≤75% of AQO	Negligible
R12*	-0.09	-0.34	0%	≤75% of AQO	Negligible
R13	-0.09	-0.37	0%	≤75% of AQO	Negligible
R14	-0.12	-0.50	1%	≤75% of AQO	Negligible
+0% means a change of <0.5% as per explanatory note 2 of table 6.3 of the EPUK IAQM Guidance.					
*Located within the AQMA					

The impact description of the effects of changes in traffic flow as a result of the proposed development, with respect to $PM_{2.5}$ exposure for existing receptors, including those within the AQMA, is determined to be 'negligible' at all receptors.

3.6 Scenario 6 - Eastern Development Spine Road + RRS

Table 3.31 (below) presents a summary of the predicted change in NO_2 concentrations at relevant receptor locations, due to changes in traffic flow associated with the development, based on modelled 'do minimum' and 'do something' scenarios.

Table 3.31 Predicted Annual Average Concentrations of NO_2 at Receptor Locations

Receptor		NO_2 (µg/m³)			
		Baseline 2019	Do Minimum 2031	Do Something 2031	Development Contribution
R1	1 London Road	35.98	22.65	21.67	-0.98
R2	2 London Road	34.79	21.98	21.02	-0.96
R3*	31 Horse Fair	45.16	26.50	24.86	-1.63
R4*	18a Horse Fair	31.36	20.57	19.74	-0.83
R5*	8 Horse Fair	28.65	19.66	18.82	-0.84
R6*	15 Horse Fair	44.05	26.29	24.24	-2.05
R7*	4 Horse Fair	44.46	26.17	24.03	-2.14
R8*	31 High Street	80.43	43.23	38.95	-4.28
R9*	26 High Street	24.92	18.32	17.83	-0.50
R10*	24 High Street	24.97	18.34	17.86	-0.49
R11*	1a Middle Row	23.42	17.72	17.28	-0.44
R12*	6 New Street	28.91	19.69	19.18	-0.52
R13	20 New Street	26.71	18.82	18.30	-0.52
R14	35 New Street	30.10	20.32	19.64	-0.67
Annual Mean AQO		**40 µg/m³**			
*Located within the AQMA					

All modelled existing receptors, including those located within the AQMA, are predicted to be below the AQO for NO_2 in both the 'do minimum' and 'do something' scenarios.

As indicated in Table 3.31, the minimum predicted decrease in the annual average exposure to NO_2 at any existing receptor, due to changes in traffic movements associated with the development, is -0.52 µg/m³ at 1a Middle Row (R11) and 6 New Street (R12). The maximum predicted decrease in the annual average exposure to NO_2 at any existing receptor, due to changes in traffic movements associated with the development, is -4.28 µg/m³ at 31 High Street (R8).

The impact description of changes in traffic flow associated with the development with respect to annual mean NO_2 exposure has been assessed. The outcomes of the assessment are summarised in Table 3.32 (below).

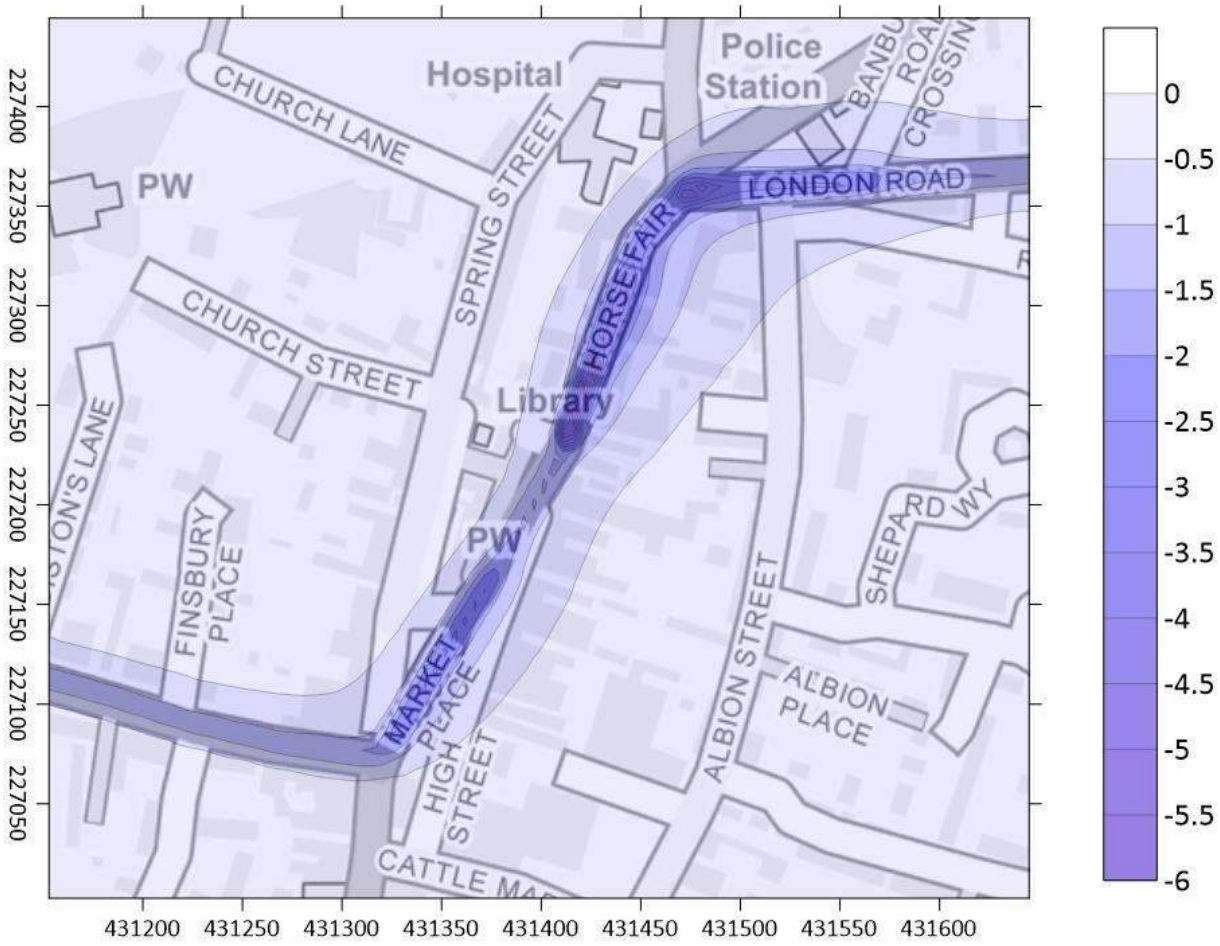
Table 3.32 Impact Description of Effects at Key Receptors (NO_2)

NO_2 Impact Description of Effects at Key Receptors					
Recep.	Change Due to Development (DS-DM) (µg/m³)	% of AQO	% Change in Concentration Relative to AQO	% Annual Mean Concentration in Assessment Year	Impact Descriptor
R1	-0.98	-2.45	2-5%	≤75% of AQO	Negligible
R2	-0.96	-2.40	2-5%	≤75% of AQO	Negligible
R3*	-1.63	-4.09	2-5%	≤75% of AQO	Negligible
R4*	-0.83	-2.08	2-5%	≤75% of AQO	Negligible
R5*	-0.84	-2.11	2-5%	≤75% of AQO	Negligible
R6*	-2.05	-5.13	2-5%	≤75% of AQO	Negligible
R7*	-2.14	-5.35	2-5%	≤75% of AQO	Negligible
R8*	-4.28	-10.70	≥10%	95-102% of AQO	Substantial
R9*	-0.50	-1.24	1%	≤75% of AQO	Negligible
R10*	-0.49	-1.21	1%	≤75% of AQO	Negligible
R11*	-0.44	-1.09	1%	≤75% of AQO	Negligible
R12*	-0.52	-1.29	1%	≤75% of AQO	Negligible
R13	-0.52	-1.29	1%	≤75% of AQO	Negligible
R14	-0.67	-1.68	2-5%	≤75% of AQO	Negligible
+0% means a change of <0.5% as per explanatory note 2 of table 6.3 of the EPUK IAQM Guidance.					
*Located within the AQMA					

The impact description of the effects of changes in traffic flow as a result of the proposed development, with respect to NO_2 exposure for existing receptors, is determined to be 'negligible' at all existing receptor locations, except R8 which is determined to be 'substantial'. Given the quantitative nature of the assessment and the verification of the air quality dispersion model, the confidence of the assessment is deemed to be 'high'.

Figure 3.11 Annual Average Nitrogen Dioxide (µgm^{-3}) Concentrations Across the Study Area

Figure 3.12 Annual Average Nitrogen Dioxide (µgm^{-3}) Contribution from Scenario 6 Across the Study Area



Particulate Matter (PM_{10})

Table 3.33 presents a summary of the predicted change in annual mean PM_{10} concentrations at relevant receptor locations, due to changes in traffic flow associated with the development, based on modelled 'do minimum' and 'do something' scenarios.

Table 3.33 Predicted Annual Average Concentrations of PM_{10} at Receptor Locations

Receptor		PM_{10} (µg/m^3)			
		Baseline 2019	Do Minimum 2031	Do Something 2031	Development Contribution
R1	1 London Road	16.42	16.52	16.16	-0.36
R2	2 London Road	16.24	16.28	15.93	-0.35
R3*	31 Horse Fair	17.28	17.40	16.92	-0.48
R4*	18a Horse Fair	15.53	15.50	15.27	-0.23
R5*	8 Horse Fair	15.13	15.13	14.92	-0.20
R6*	15 Horse Fair	16.73	16.79	16.35	-0.44

Receptor		PM_{10} (µg/m³)			
		Baseline 2019	Do Minimum 2031	Do Something 2031	Development Contribution
R7*	4 Horse Fair	16.71	16.68	16.24	-0.44
R8*	31 High Street	22.09	22.60	21.34	-1.26
R9*	26 High Street	14.98	15.04	14.85	-0.20
R10*	24 High Street	15.01	15.09	14.88	-0.20
R11*	1a Middle Row	14.73	14.76	14.61	-0.16
R12*	6 New Street	15.59	15.63	15.38	-0.25
R13	20 New Street	15.40	15.43	15.17	-0.26
R14	35 New Street	15.96	16.11	15.75	-0.36
Annual Mean AQO		**40 µg/m³**			
*Located within the AQMA					

All modelled existing receptors are predicted to be below the AQO for PM_{10} in both the 'do minimum' and 'do something' scenarios.

As indicated in Table 3.33, the minimum predicted decrease in the annual average exposure to PM_{10} at any existing receptor, due to changes in traffic movements associated with the development, is -0.16 µg/m³ at 1a Middle Row (R11). The maximum predicted decrease in the annual average exposure to PM_{10} at any existing receptor, due to changes in traffic movements associated with the development, is -1.26 µg/m³ at 31 High Street (R8).

The impact description of changes in traffic flow associated with the development with respect to annual mean PM_{10} exposure has been assessed. The outcomes of the assessment are summarised in Table 3.34.

Table 3.34 Impact Description of Effects at Key Receptors (PM_{10})

PM_{10} Impact Description of Effects at Key Receptors					
Recep.	Change Due to Development (DS-DM) (µg/m³)	% of AQO	% Change in Concentration Relative to AQO	% Annual Mean Concentration in Assessment Year	Impact Descriptor
R1	-0.36	-0.90	1%	≤75% of AQO	Negligible
R2	-0.35	-0.88	1%	≤75% of AQO	Negligible
R3*	-0.48	-1.20	1%	≤75% of AQO	Negligible
R4*	-0.23	-0.59	1%	≤75% of AQO	Negligible
R5*	-0.20	-0.50	1%	≤75% of AQO	Negligible
R6*	-0.44	-1.09	1%	≤75% of AQO	Negligible
R7*	-0.44	-1.10	1%	≤75% of AQO	Negligible
R8*	-1.26	-3.16	2-5%	≤75% of AQO	Negligible
R9*	-0.20	-0.49	0%	≤75% of AQO	Negligible
R10*	-0.20	-0.51	1%	≤75% of AQO	Negligible

PM_{10} Impact Description of Effects at Key Receptors					
Recep.	Change Due to Development (DS-DM) (µg/m³)	% of AQO	% Change in Concentration Relative to AQO	% Annual Mean Concentration in Assessment Year	Impact Descriptor
R11*	-0.16	-0.39	0%	≤75% of AQO	Negligible
R12*	-0.25	-0.61	1%	≤75% of AQO	Negligible
R13	-0.26	-0.66	1%	≤75% of AQO	Negligible
R14	-0.36	-0.90	1%	≤75% of AQO	Negligible
+0% means a change of <0.5% as per explanatory note 2 of table 6.3 of the EPUK IAQM Guidance.					
*Located within the AQMA					

The impact description of the effects of changes in traffic flow as a result of the proposed development, with respect to PM_{10} exposure for existing receptors, including those within the AQMA, is determined to be 'negligible' at all receptors.

Particulate Matter ($PM_{2.5}$)

Table 3.35 (below) presents a summary of the predicted change in annual mean $PM_{2.5}$ concentrations at relevant receptor locations, due to changes in traffic flow associated with the development, based on modelled 'do minimum' and 'do something' scenarios.

Table 3.35 Predicted Annual Average Concentrations of $PM_{2.5}$ at Receptor Locations

Receptor		$PM_{1.5}$ (µg/m³)			
		Baseline 2019	Do Minimum 2031	Do Something 2031	Development Contribution
R1	1 London Road	10.72	10.66	10.45	-0.21
R2	2 London Road	10.61	10.52	10.32	-0.20
R3*	31 Horse Fair	11.31	11.20	10.91	-0.28
R4*	18a Horse Fair	10.18	10.07	9.94	-0.14
R5*	8 Horse Fair	9.93	9.85	9.73	-0.12
R6*	15 Horse Fair	10.99	10.86	10.60	-0.26
R7*	4 Horse Fair	10.98	10.80	10.53	-0.26
R8*	31 High Street	14.45	14.33	13.58	-0.75
R9*	26 High Street	9.81	9.79	9.68	-0.11
R10*	24 High Street	9.83	9.81	9.70	-0.12
R11*	1a Middle Row	9.66	9.63	9.54	-0.09
R12*	6 New Street	10.19	10.13	9.99	-0.14
R13	20 New Street	10.06	10.01	9.86	-0.15
R14	35 New Street	10.40	10.41	10.20	-0.21
Annual Mean AQO		**25 µg/m³**			
*Located within the AQMA					

All modelled existing receptors are predicted to be below the AQO for $PM_{2.5}$ in both the 'do minimum' and 'do something' scenarios.

As indicated in Table 3.35, the minimum predicted decrease in the annual average exposure to $PM_{2.5}$ at any existing receptor, due to changes in traffic movements associated with the development, is -0.09 µg/m^3 at 1a Middle Row (R11). The maximum predicted decrease in the annual average exposure to $PM_{2.5}$ at any existing receptor, due to changes in traffic movements associated with the development, is -0.75 µg/m^3 at 31 High Street (R8).

The impact description of changes in traffic flow associated with the development with respect to annual mean $PM_{2.5}$ exposure has been assessed. The outcomes of the assessment are summarised in Table 3.36 (below).

Table 3.36 Impact Description of Effects at Key Receptors ($PM_{2.5}$)

$PM_{2.5}$ Impact Description of Effects at Key Receptors					
Recep.	**Change Due to Development (DS-DM) (µg/m³)**	**% of AQO**	**% Change in Concentration Relative to AQO**	**% Annual Mean Concentration in Assessment Year**	**Impact Descriptor**
R1	-0.21	-0.83	1%	≤75% of AQO	Negligible
R2	-0.20	-0.82	1%	≤75% of AQO	Negligible
R3*	-0.28	-1.13	1%	≤75% of AQO	Negligible
R4*	-0.14	-0.55	1%	≤75% of AQO	Negligible
R5*	-0.12	-0.48	0%	≤75% of AQO	Negligible
R6*	-0.26	-1.05	1%	≤75% of AQO	Negligible
R7*	-0.26	-1.06	1%	≤75% of AQO	Negligible
R8*	-0.75	-2.99	2-5%	≤75% of AQO	Negligible
R9*	-0.11	-0.46	0%	≤75% of AQO	Negligible
R10*	-0.12	-0.47	0%	≤75% of AQO	Negligible
R11*	-0.09	-0.36	0%	≤75% of AQO	Negligible
R12*	-0.14	-0.57	1%	≤75% of AQO	Negligible
R13	-0.15	-0.60	1%	≤75% of AQO	Negligible
R14	-0.21	-0.82	1%	≤75% of AQO	Negligible
+0% means a change of <0.5% as per explanatory note 2 of table 6.3 of the EPUK IAQM Guidance.					
*Located within the AQMA					

The impact description of the effects of changes in traffic flow as a result of the proposed development, with respect to $PM_{2.5}$ exposure for existing receptors, including those within the AQMA, is determined to be 'negligible' at all receptors.

3.7 Comparison of Scenarios

Table 3.37 Maximum Change at any Assessed Receptor

Change Due to Development at any Assessed Receptor (µg/m³)			
Scenario	**NO_2 (µg/m³)**	**PM_{10} (µg/m³)**	**$PM_{1.5}$ (µg/m³)**
Scenario 1	-1.91	-0.50	-0.29
Scenario 2	0.41	0.11	0.06
Scenario 3	-1.31	-0.34	-0.20
Scenario 4	-1.31	-0.34	-0.20
Scenario 5	-2.30	-0.76	-0.45
Scenario 6	-4.28	-1.26	-0.75

Table 3.38 Minimum Change at any Assessed Receptor

Change Due to Development at any Assessed Receptor (µg/m³)			
Scenario	**NO_2 (µg/m³)**	**PM_{10} (µg/m³)**	**$PM_{1.5}$ (µg/m³)**
Scenario 1	-0.17	-0.06	-0.04
Scenario 2	0.03	0.01	0.01
Scenario 3	-0.12	-0.04	-0.02
Scenario 4	-0.12	-0.04	-0.02
Scenario 5	-0.27	-0.09	-0.06
Scenario 6	-0.44	-0.16	-0.09

4. Summary and Conclusion

WYG has been appointed by Oxfordshire County Council to provide air quality advice in regarding HGV traffic movements through Chipping Norton High Street.

This Technical Note has been prepared with the aim of demonstrating the Nitrogen Dioxide (NO_2), and Particulate Matter (PM_{10} and $PM_{2.5}$) concentrations associated with each proposed scenario.

All of the proposed HGV traffic scenarios, excluding Scenario 2 (Rollright Stones Weight Limit), that utilise the public highway are predicted to result in a 'negligible' change in NO_2, PM_{10}, and $PM_{2.5}$ at all existing sensitive receptors. As such Scenarios 1, 3, 4, 5 and 6 are deemed suitable and deliverable with respect to Air Quality.

Scenario 6 (Eastern Development Spine Road + RRS) results in the greatest reduction in NO_2, PM_{10}, and $PM_{2.5}$.

Appendix A Report Conditions

This Report has been prepared using reasonable skill and care for the sole benefit of Oxfordshire County Council ("the Client") for the proposed uses stated in the report by WYG Environment Planning Transport Limited ("WYG"). WYG exclude all liability for any other uses and to any other party. The report must not be relied on or reproduced in whole or in part by any other party without the copyright holder's permission.

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The report refers, within the limitations stated, to the environment of the site in the context of the surrounding area at the time of the inspections'. Environmental conditions can vary, and no warranty is given as to the possibility of changes in the environment of the site and surrounding area at differing times. No investigative method can eliminate the possibility of obtaining partially imprecise, incomplete or not fully representative information. Any monitoring or survey work undertaken as part of the commission will have been subject to limitations, including for example timescale, seasonal and weather-related conditions. Actual environmental conditions are typically more complex and variable than the investigative, predictive and modelling approaches indicate in practice, and the output of such approaches cannot be relied upon as a comprehensive or accurate indicator of future conditions. The "shelf life" of the Report will be determined by a number of factors including; its original purpose, the Client's instructions, passage of time, advances in technology and techniques, changes in legislation etc. and therefore may require future re-assessment.

The whole of the report must be read as other sections of the report may contain information which puts into context the findings in any executive summary.

The performance of environmental protection measures and of buildings and other structures in relation to acoustics, vibration, noise mitigation and other environmental issues is influenced to a large extent by the degree to which the relevant environmental considerations are incorporated into the final design and specifications and the quality of workmanship and compliance with the specifications on site during construction. WYG accept no liability for issues with performance arising from such factors.

Appendix E – Archaeological and Heritage Appraisal

Chipping Norton HGV Route

Archaeological and Heritage Appraisal

A118418

Oxfordshire County Council
Prepared on behalf of WYG Group Limited.
September 2020

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Contents.

1. Non-Technical Summary

This Archaeological and Heritage assessment has been prepared to support the consideration of the proposed HGV Route for future development and alteration. The proposals aim to alleviate congestion within Chipping Norton. This study examines potential for effects of the proposed HGV routes through and to the north of Chipping Norton on the cultural heritage and the surrounding area. The proposed routes were both found to include potential for previously unrecorded archaeological remains, due to the identified evidence found relating to the proposed routes and surrounding areas. A programme of further archaeological assessment has been advised, including consultation with Historic England and the Lead Archaeologist at Oxfordshire County Council.

2. Introduction

This appraisal has been prepared by Martin Brown, (MCIfA), Associate Archaeologist, WYG, on behalf of Oxfordshire County Council, to inform the proposed alteration of the HGV Route in Chipping Norton. It aims to provide initial assessment of the potential effects of increased HGV traffic on the town centre (A44/High Street/Market Place) of Chipping Norton and Cross Hands Lane, north of the town.

2.1 Aims and Objectives

Although not a formal Desk-Based Assessment within the relevant Chartered Institute for Archaeologists (CIfA) Standard and Guidance, this report has been prepared in accordance with and in respect of those guidelines (2017).

This Assessment will indicate the nature, extent and significance of the historic environment within a specified area. It will be undertaken using appropriate methods and practices which satisfy the stated aims of the project, and which comply with the relevant regulations of CIfA (2017). The assessment will indicate the impact of the proposed development on the significance of the historic environment (or will identify the need for further evaluation to do so) and will enable reasoned proposals and decisions to be made whether to mitigate, offset or accept without further intervention that impact.

This study examines the cultural heritage potential of the proposed development site and the surrounding area. The aim of the study is to:

- Identify recorded cultural heritage sites within the site boundary and located nearby with settings and significance affected by the proposal;
- Identify the potential for previously unrecorded sites to be present within the site;

- Identify potential impacts and mitigation strategies where appropriate; and,
- Make recommendations for further work where required.

The Historic Environment, as defined by NPPF (2019), comprises all surviving remains of interaction between people and places through time; this includes all buried and upstanding archaeological remains, built heritage sites, historic and managed landscapes, and any other features that contribute to the archaeological and historic interest of the area, including their settings. Designated and non-designated heritage assets have been considered.

This appraisal considers the heritage potential within the site itself, the surrounding area and wider local context. In terms of its archaeological content, this assessment does not attempt to plot and review every archaeological find and monument; rather, it aims to examine the distribution of evidence and to use this to predict the archaeological potential of the study area and the likely impacts of the development proposals on those remains.

3. Site Location and Conditions

The proposed HGV routes include within Chipping Norton, following the A44/High Street, and on an unclassified road called Cross Hands Lane, to the north of the town and running between the A44 in the west and the A3400 in the east. The High Street route is centred on SP 31383 27206. It runs from New Street at its southern end, northwards along the High Street, through the Market Place and Horse Fair, to the Junction with London Road, at its northern end. Meanwhile, the northern route runs along Cross Hands Lane from SP 30689 29450, the A44 junction, to SP 27103 28918, the A3400 junction, and is characterised by public highway, ranging from approximately 200m above Ordnance Datum (aOD) within the town centre, to 244m aOD,approximately the highest point of the east-west route. A site location plan, showing both routes, can be seen in Appendix A.

The southern element of the proposal within Chipping Norton, has commercial and residential properties on the either side of the High Street, the Market Place and Horse Fair, while the Cross Hands Lane section passes along a tarmacadamed road bounded on either side by grass verges and hedges, with some standard trees. There is extensive agricultural land to both north and south of the road and hedges.

The geology of the area comprises Clypeus Grit Member of the Chipping Norton Formation an Oodial Limestone, which is a sedimentary bedrock formed approximately 166 to 170 million years ago in the Jurassic Period. It is the product of a local environment previously dominated by shallow carbonate seas and intermittently overlaid by broader subaerial deposits of Quaternary date (clays and silts) (NERC 2020).

Overlying soils include freely draining slightly acid loamy soils in the town centre, and shallow lime-rich soils over the limestone bedrock, the subaerial deposits of Quaternary date (Cranfield University 2020).

4. Methodology

A high-level impact assessment has been carried out through the consideration of identified elements of the scheme that could cause impacts to cultural heritage.

The assessment has been undertaken in line with the guidelines established by CIfA (2017). WYG has developed its own heritage evaluation and assessment method using a combination of the Secretary of State's criteria for Scheduling Monuments (Scheduled Monument Statement, Annex 1), Design Manual for Roads and Bridges, Volume 11, Part 3, Section 2, HA 208/07 and Transport Analysis Guidance (TAG Unit 3.3.9, Heritage of Historic Resources Sub-Objective), details of which can be found in Appendix B. Professional judgment and good practice guidance including the values laid out in Conservation Principles (Historic England 2008 Historic England's Conservation Principles (**Evidential**, **Historical**, **Aesthetic** and **Communal** values) is used in conjunction with these criteria to undertake the significance and impact assessment. The full assessment methodology is included as Appendix B.

4.1 Sources Consulted

A study area of 1km around the proposed works has been examined to assess the nature of the surrounding cultural heritage sites and place the recorded assets within their local context. This study area was defined in consultation with the Oxfordshire Historic Environment Record. This study has taken into consideration the historical and archaeological background of the area. The sources consulted were:

- The Oxfordshire Historic Environment Record;
- National Record of the Historic Environment (NRHE) (formerly the (NMR);
- Historic England for designated sites;
- Local Planning Authority for designated and non-designated heritage assets;
- Aerial photographs – online sources including Google Earth and Britain From Above;
- Historic mapping including early Ordnance Survey mapping from online sources; and,
- Secondary research including, regional research frameworks and grey literature and journal articles, as appropriate.

5. Planning Policy Context

5.1 National Legislation and Guidance

5.1.1 Ancient Monuments and Archaeological Areas Act 1979

Scheduled Monuments are designated by the Secretary of State for Culture, Media and Sport on the advice of Historic England as selective examples of nationally important archaeological remains. Under the terms of Part 1 Section 2 of the Ancient Monuments and Archaeological Areas Act 1979 it is an offence to damage, disturb or alter a Scheduled Monument either above or below ground without first obtaining permission from the Secretary of State. This Act does not allow for the protection of the setting of Scheduled Monuments.

5.1.2 Planning (Listed Buildings and Conservation Areas) Act, 1990

The Act outlines the provisions for designation, control of works and enforcement measures relating to Listed Buildings and Conservation Areas. Section 66 of the Act states that the planning authority must have special regard to the desirability of preserving the setting of any Listed Building that may be affected by the grant of planning permission. Section 72 states that special attention shall be paid to the desirability of preserving or enhancing the character or appearance of Conservation Areas.

5.1.3 Protection of Military Remains Act, 1986

The Protection of Military Remains Act is designed to secure the protection from unauthorised interference of the remains of military aircraft and vessels that have crashed, sunk or been stranded and of associated human remains. The Act allows for two levels of protection: Protected Places, where aircraft and wrecks can be observed, but it is an offence to interfere, disturb or remove anything from the site; and Controlled Sites, where it is illegal to undertake any operations (including excavation or diving) which may disturb remains without a licence. The wreckage of all military aircraft are automatically given Protected Place status, whereas vessels have to be specifically identified and designated.

5.1.4 National Planning Policy Framework 2019

The National Planning Policy Framework (NPPF) sets out the Government's national planning policies including those on the conservation of the historic environment. The NPPF covers all aspects of the historic environment and heritage assets including designated assets (World Heritage Sites, Scheduled Monuments, Listed Buildings, Protected Wreck Sites, Conservation Areas, Registered Parks and Gardens and Registered Battlefields) and non-designated assets of local historic value. The NPPF draws attention to the benefits that conserving the historic environment can bring to the wider objectives of the NPPF in relation to sustainability, social, cultural, environmental and economic benefits and place-making (para 185).

The NPPF states that the significance of heritage assets (including their settings) should be identified, described and the impact of the proposal on the significance of the asset should be assessed. The NPPF identifies that the requirements for assessment and mitigation of impacts on heritage assets should be proportional to their heritage importance, and the level of assessment should be sufficient to understand potential impacts of proposals upon the significant of the affected assets. Where assets or potential assets of archaeological interest are present, the planning application should include sufficient information to enable the impact of proposals on significance to be assessed: *this may include desk-based research and where necessary, field evaluation* (para 189).

The NPPF sets out the approach local authorities should adopt in assessing development proposals within the context of applications for development of both designated and non-designated assets. *Great weight should be given to the conservation of designated heritage assets and harm or loss to significance, irrespective of whether potential harms amounts to substantial harm, total loss of less than substantial harm to significance* (para 193). *Any harm to or loss of significance should require clear and convincing justification*. *Substantial harm to or loss of a Grade II Listed Building, Park or Garden should be exceptional. Substantial harm to or loss of designated heritage assets of the highest significance, notably Scheduled Monuments, Protected Wreck Sites, Registered Battlefields, Grade I and II* Listed Buildings, Grade I and II* Registered Parks and Gardens, and World Heritage Sites, should be wholly exceptional* (para 194). Additional guidance is given on the consideration of elements within World Heritage Sites and Conservation Areas (para 201).

Where there is substantial harm to or loss of significance of a designated heritage asset, consent must be refused unless a number of criteria are met, including achieving substantial public benefits that outweigh the harm or loss (para 195). Where there is less than substantial harm, the harm should be weighed against the public benefits of the development (para 196). Balanced judgements should be made when weighing applications that directly or indirectly affect non-designated heritage assets (para 197). The NPPF also makes provision to allow development which enhances World Heritage Sites and Conservation Areas (para 200). *Non-designated assets of archaeological interest that are of demonstrable equivalent significance to scheduled monuments, should be considered subject to the policies for designated heritage assets* (footnote 63).

Where loss of significance as a result of development is considered justified, the NPPF includes provision to allow for the recording and advancing understanding of the asset before it is lost in a manner proportionate to the importance and impact. The results of these investigations and the archive should be made publicly accessible. The ability to record evidence should not however be a factor in deciding whether loss should be permitted (para 199 and footnote 64) (Ministry of Housing, Communities and Local Government, 2019).

5.1.5 Historic Environment Good Practice in Planning Note 3: The Setting of Heritage Assets second edition (Historic England 2017)

Historic Environment Good Practice Advice in Planning Note 3: The Setting of Heritage Assets second edition (Historic England, 2017) provides more detailed advice on how to approach setting assessments and expands upon the NPPF and related guidance in PPG. This 2017 guidance supersedes Good Practice Advice 3 – The Setting of Heritage Assets (2017) and Seeing the History in the View: A Method for assessing Heritage Significance within Views (English Heritage, 2011). A five-step process is recommended for proportionate setting assessments, of which steps 1-4 have been taken into account in preparing this assessment:

- ***Step 1:*** *identify which heritage assets and their settings are affected;*
- ***Step 2:*** *assess the degree to which these settings and views make a contribution to the significance of the heritage asset(s) or allow significance to be appreciated;*
- ***Step 3:*** *assess the effects of the proposed development, whether beneficial or harmful, on the significance or the ability to appreciate it; and,*
- ***Step 4:*** *explore the way to maximise enhancement and avoid or minimise harm.*

Also of relevance to the proposed development is the following advice:

- *The settings of heritage assets change over time. Understanding the history of change will help to determine how further development within the asset's setting is likely to affect the contribution made by setting to the significance of the heritage asset.*

5.1.6 Planning Practice Guidance (PPG): Historic Environment (MHCLG, July 2019)

This guidance has been updated in support of the NPPF (2019) and reiterates the importance of assessing heritage assets in a manner appropriate to their significance, and the contribution to its setting, to better understand the potential impact and acceptability of development proposals.

Conservation is an active process of maintenance and managing change, requiring a flexible and thoughtful approach. The neglect and decay of heritage assets is best addressed by ensuring that they have a viable use that is consistent with their conservation.

An important consideration should be whether development proposals adversely affect (harm) a heritage asset's significance. Key elements of the guidance relate to assessing harm as 'substantial' or 'less than substantial' in accordance with NPPF paragraphs 196-198. Critically, it is the degree of harm to the heritage asset's significance rather than the scale of the development that is to be assessed and should be explicitly identified.

The level of substantial harm is stated to be a 'high test'. Whether development proposals cause substantial harm will be a judgment in the decision-taking process, having regard to the circumstances of the case and by applying the relevant NPPF paragraphs. The harm may arise directly from works to the heritage asset, or indirectly from development within its setting. A thorough assessment of the harm that development proposals will have on this setting needs to consider, and be proportionate to, the heritage asset's significance and the degree to which any changes enhance or detract from that significance, and the ability to appreciate and experience it.

5.2 Local Policy and Guidance

5.2.1 Oxford Local Plan (adopted 2020)

The Oxford Local Plan sets out the policies and proposals for future development and land use in Oxford for the period 2016 to 2036. The Local Plan includes a number of policies of relevance to the historic environment and the site:

- DH2- Views and building heights
- DH3- Designated Heritage Assets
- DH4- Archaeological Remains
- DH5- Local Heritage Assets

5.2.2 West Oxfordshire Local Plan 2013 (adopted September 2018)

The West Oxfordshire Local Plan sets out a vision of the District in 2031 and provides an overarching framework to guide and deliver that vision. The plan has been shaped by extensive community engagement which has helped to ensure that it focuses on those issues of greatest significance to West Oxfordshire. Some of these issues are locally specific such as traffic congestion on the A40, whilst others are broader in nature including housing affordability, climate change and the need for economic growth.

The policies with relate to the historic environment are:

- EH9- Historic Environment
- EH10- Conservation Areas
- EH11- Listed Buildings
- EH12- Traditional Buildings
- EH13- Historic Landscape Character

- EH14- Registered historic parks and gardens
- EH15- Scheduled Monuments and other nationally important archaeological remains
- EH16- Non-designated assets

6. Baseline Data

Period	Description	Date range
Palaeolithic and Mesolithic	The Palaeolithic is divided into the Lower, Middle and Upper Palaeolithic, and is characterised by hunting practices and flint tools. The Mesolithic is often characterised by the microlithic flint industry and a gradual move towards cultivation and domestics.	Up to 4,000 BCE
Neolithic	A period typically associated with the appearance of large ritual and ceremonial monuments in the landscape, and a reliance on cultivation practices and domestics, as well as the first appearance of pottery in the archaeological record.	4,000 BCE to 2,200 BCE
Bronze Age	The period is subdivided into the Early, Middle and Late Bronze Age, and is typically characterised by the appearance of bronze metalworking in the archaeological record, a change in domestic and ceremonial architecture, and increased agricultural activity and land management.	2,200 BCE to 700 BCE
Iron Age	The Iron Age is characterised by increasing evidence for land management and the use of iron, as well as defensive monuments such as hillforts and oppida. There is also increased evidence for continental influences in the pre-conquest period.	800/700 BCE to 43 CE
Romano-British	Traditionally, the Romano-British period begins with the Roman invasion in 43 CE and ends with the emperor Honorius directing Britain to see to its own defence in 410 CE. The period is characterised by military operations, the establishment of central civitates for instance, while on a regional scale, vernacular architecture and traditions persisted.	43 CE to c. 450 CE
Anglo-Saxon/ early medieval	Following the breakdown of Roman rule, incoming Angles and Saxons established a series of kingdoms in England, including Northumbria and Wessex. The earlier part of the period was associated with paganism, with the emergence of Christianity and establishment of the church from the 5th century. By the 9th century, the manorial system was widespread.	450 CE to 1066 CE
Later medieval	The later medieval period commences with the Norman Invasion and culminates with the dissolution of the monasteries. Following the conquest, castles were established as a sign of power, and often provided the focus of royal and ecclesiastical centres. More and more marginal land was also exploited to support agriculture and expanded industry.	1066 CE to 1540 CE
Post-medieval	The post-medieval period is an age of transition between the medieval world and the Industrial and Agricultural revolutions of the 18th and early 19th century. The period is characterised by the expansion of economy and industry that contributed to the onset of industrialisation, although activity was typically centred on small workshops and 'cottage' industries. For many, ordinary life was disrupted by conflict culminating in the Civil Wars.	c. 1540 CE to 1750 CE
Industrial	The catalyst for the Industrial Revolution was steam and coal driven technology, and led to the establishment of large factories, foundries and works. The growing demand for resources such as coal also led to the establishment of canals to more effectively link mines to industrial centres,	1750 CE to 1900 CE

	while the 'Turnpike Acts' allowed new roads to be established. By the 19th century, the establishment of the railway further transformed the landscape, and as well as mineral resources, also carried passengers.	
Modern	Warfare is perhaps the most enduring image of 20th century Britain, bringing about major economic and social changes, as well as defensive and commemorative structures. Extant military structures and defence landscapes survive in many parts of the country	1900 CE onwards

6.1 Designated Sites

A study area of 1km around the application site has been examined to assess the nature of the surrounding cultural heritage sites and place the recorded sites within their context. There are no World Heritage Sites, nor any Registered Battlefields, and only a small part of one Registered Park and Garden, within the search area. The Registered Park is the Grade II Cornwell Park, which encloses the Grade II* listed post-medieval house of the same name (1001093).

The study area includes Scheduled Monuments, the Chipping Norton Conservation Area and listed buildings. Not all designated assets have been included in this appraisal; professional judgement has been used to identify those likely to be impacted by any proposed works. The following sections outline the designated sites for each area?

Bracketed numbers within the text refer to the identifiers from NHRE.

6.1.1 Chipping Norton High Street

There are 126 listed buildings in Chipping Norton. One is Grade I, 11 at Grade II* and 114 at Grade II (West Oxon 2013: 16). The buildings fronting the Market Place and the High Street within the proposed HGV route are all listed. While most are Grade II listed, there are a number of Grade II* listed buildings. There is also one nearby Grade I listed building, the parish church.

- The Church of St Mary is a Grade I listed building (1052637). It has 12th century origins, 13th and 14th century rebuilding in the chancel and aisles, a nave of around 1485, a west tower of 1823 by John Hudson, with extensive restoration of the church by E G Bruton in 1878.
- The Grade II* listed Town Hall (1183188) is a Palladian structure of 1842, by G S Repton. Its north front faces the Market Place.
- 15 Market Place (1052623) is listed Grade II* and is a building originally constructed as a pair of 17th century cottages that were extended and refaced in 1780.

- The White Hart Hotel (251632) is Grade II* listed and includes a 16th century timber-framed building with an 18th century facade in a local interpretation of Baroque.
- The Playpen (1052618) is a Grade II* listed house, with a later 14th century core with 18th and 20th century extensions and additions.
- Number 7, High Street is Grade II* listed (1052656), with 18th century origins.
- Number 16, High Street is Grade II* listed (1183153), with 18th century origins. Originally built as a house, it has been used in the modern era as a bank.
- Number 15, High Street is Grade II* listed (1368162), with 18th century origins. Originally built as a house, it has been used in the modern era as a bank.

The Chipping Norton Conservation Area includes the High Street, Market Place and Horse Fair (West Oxon 2013a). The Conservation Area Character Assessment describes the main aspects of character or appearance which contribute to the special interest and quality of the area and proposes a set of proposals for the preservation and enhancement of the Conservation Area, outlining strategies for its future maintenance and improvement. It also provides development advice development advice and guidance on conversions, extensions and the design of new buildings (West Oxon 2013: 3). The appraisal notes that the core of the town has remained essentially unchanged for over 600 years, but that there has been significant 20th and 21st century expansion, and that further development pressure is likely (West Oxon 2013: 6).

The Character Assessment includes a street-by-street analysis of the Conservation Area, describing the key features that contribute to the character and interest of each of its constituent parts. The Market Place and High Street are discussed as a single unit (West Oxon 2013: 23-24). The Market Place representing the core of the 13th century planned town that has a slightly tapering, rectangular market square lined with and containing, a number of fine buildings with frontages dating mainly from C18 and C19. The appraisal describes this are as "The most historically and architecturally important part of the town and CA" (West Oxon 2013: 23).

West Oxfordshire also has locally listed buildings and there are 468 designated as such within the conservation area. Although not a statutory designation, local listing seeks to recognise buildings which make a significant contribution to the character of a conservation area, or that have architectural or historic merit. The locally listed buildings represent highly significant components of the built environment, and they contribute to the appearance, character and fabric of the conservation area. Many of these buildings are described as good examples of local vernacular architecture that may be considered to be "period buildings of sound, unpretentious design constructed from local materials" (West Oxon 2013: 32). The landmark status or the architectural quality of these buildings plays a particularly significant role within the conservation area.

6.1.2 Cross Hands Lane

There are two Scheduled Monuments close to the western end of Cross Hands Lane. They fall within the search area but are on the western side of the A44 and will not be directly affected by the proposals:

- The portal dolmen south east of Burnt Hill (1008404) is a funerary and ceremonial monument of the Early and Middle Neolithic period. It is located 380m south west of the junction of the A44 and the western end of the Cross Hands Lane.
- There is a Neolithic long barrow (1008403) 150m to the south-east of the Burnt Hill portal dolmen.

There are two Scheduled Monuments south of King Stone Farm, approximately 860m west of the junction of Cross Hands Lane and the A3400. The monuments are:

- An Iron Age enclosed settlement and part of a trackway 150m north east of the King Stone (1018402) is located immediately north of Cross Hands Lane.
- The Rollright Stones, which is a composite Scheduling (1018400) that includes the King's Men stone circle, the Whispering Knights, the remains of a Neolithic portal dolmen, both south of the lane, and the King Stone, a Prehistoric marker stone, situated north of the lane.

There are a number of listed buildings within 750m of Cross Hands Lane:

- Brighthill Farmhouse is Grade II listed (1368055). It is located 300m south of the lane and is believed to have 17th century origins with 18th century remodelling.
- The church of St Philip in Little Rollright is Grade II* listed. It has 13th century origins with additions and alterations during the 15th, 16th and 17th centuries.
- The remains of a medieval cross are located in St Philip's churchyard (1262813).
- The Barn approx. 130m north-east of Church of St. Philip in Little Rollright dates from 1801. It is Grade II listed.
- The Old Rectory of Little Rollright (1251363) is Grade II listed and is dated 1640, with later 17th century additions.

6.2 Archaeological and Historic Background

6.2.1 Prehistoric

No Palaeolithic remains are recorded in the study area.

A Mesolithic flint scatter was found west of the King Stone (MWA6041).

The Neolithic was a period of increasingly permanent human occupation, although seasonal mobility and the exploitation of wild resources continued throughout the period. Mortuary monuments, along with the introduction of pottery, domesticates and arable farming practices mark the beginning of the Neolithic period, and the construction of large ceremonial monuments arguably marks a clear change in ideology from the preceding Mesolithic period. Typical Neolithic ceremonial monuments in the region include long barrows and stone circles. The portal dolmen (1008404) south east of Burnt Hill is a funerary and ceremonial monument of the Early and Middle Neolithic period, as are the Whispering Knights stone group, part of the Rollright Stones Scheduling (1018400). The Burnt Hill portal dolmen is located 380m south west of the junction of the A44 and the western end of Cross Hands Lane. There is a Neolithic long barrow (1008403) 150m to the south-east of the Burnt Hill portal dolmen; long barrows replaced the earlier portal dolmens in the Middle Neolithic. A middle Neolithic bank barrow lies immediately north of the HGV route as it passes north of the Rollright Stones and west of the King Stone (1018400). The Rollright Stones (1018400) are believed to be the easternmost stone circle in England, they are estimated to date to between 2500-2000 BCE. A further standing stone was recorded in the 1920s between the A44 and the Burnt Hill portal dolmen but appears to be no longer extant (MWA3818).

The Bronze Age is characterised by significant changes in material culture, and in domestic and ceremonial architecture. The introduction of bronze metalworking is traditionally associated with the appearance of Beaker culture. Mortuary ceremonies also change emphasis in this period, with a shift from the large communal complexes and inhumations of the Neolithic, to individual cremations and round barrow cemeteries. The Over Norton bowl barrow (1009431), north-east of Chipping Norton, is typical of this form of burial mound. The King Stone and associated cairn and barrow (1018400), are believed to date to the Bronze Age, while the round barrows north of the King's Men may be later Neolithic or early Bronze Age (MWA2397, MWA2399, MWA2395), and form part of a wider barrow cemetery that straddles the road and identified by geophysical survey by the Oxford Archaeology Unit (ADS 1986).

By the Iron Age, evidence of field systems and defended sites, including hillforts, increases in the landscape and there is much stronger evidence for continental influences than earlier periods. The hillfort of Chastleton Barrow (1008402) is located 1300m to the west of the A44, at the western end Cross Hands Lane. There is also a Scheduled Iron Age settlement immediately north of the Rollright Stones (MWA5536).

6.2.2 Romano-British

Oxfordshire was occupied following Claudius' successful invasion of Britain in 43 CE, and there is significant evidence for the extent of adoption of Roman culture in the region from an early date, including the production of Oxfordshire ware, that included the manufacture of vessels in the Samian tradition. The Cotswolds appears to have seen extensive agricultural exploitation and its fertile soils supported a thriving economy.

Extensive cropmarks identified along Cross Hands Lane indicate enclosures, field systems and routeways, thought to be Romano-British in origin (1075331). In addition, a possible Romano-Celtic temple has been identified to the north-west of Little Rollright (MOX8487), with an associated enclosure (*temenos*), (1023801). There is an identified Roman site east of Chipping Norton that may represent a settlement, shrine or villa (MOX23833).

6.2.3 Early medieval/Anglo-Saxon

By the second half of the 5th century, there are a relatively high number of Anglo-Saxon cemetery sites within Oxfordshire (Crawford, 2010) but domestic remains are less well represented. Anglo-Saxon pottery was typically handmade and fired at relatively low temperatures, leading to its poor survival in the archaeological record; likewise, houses were timber-framed and often comprised sunken-features, that do not survive as above ground features. The settlement at Chipping Norton is believed to have early medieval origins, indicated by the Old English Chipping place name, which means *market place* (Mills 2003: 154). A Saxon cemetery (MWA2396) has been excavated close to the Rollright Stones and demonstrates the influence of early Saxon culture and settlement. It also suggests that the stones remained a meaningful and, perhaps sacred space at this time and is typical of a pattern of adoption and reuse of earlier landmarks and sacred sites at this time.

6.2.4 Medieval

The Norman Conquest of 1066 provides a firm date for the commencement of the later medieval period across England and documentary evidence becomes increasingly important through this period. Even before the Norman Conquest, the geography of the southern England had undergone significant change throughout the Anglo-Saxon and early medieval period to arrive at a highly organised landscape under the manorial system recorded in the Domesday survey in 1086. The arrival of the Norman aristocracy and the socio-political change it engendered is demonstrated in the imposition of the motte and bailey castle, such as the example on the northern edge of Chipping Norton (1014747).

The Domesday survey in records the village 'Norton', meaning settlement, "to the north of". The place name may represent, the town's relationship to the more significant minster town of Charlbury to the south. The Norman village settlement was centred on the church and castle, while the modern town is centred on the marketplace to the south-east (West Oxon 2013: 10). The modern centre of Chipping Norton is a 13th century medieval planned town with the large, open marketplace at its core. This suggests wholesale reorganisation of the settlement at this time, including a shift from the Norman foci of church and castle. The town still exhibits a series of burgage plots/ These are rectangular urban plots of regular size and shape, aligned in parallel ranks, with a narrow street frontage typically occupied by a dwelling, and an area of open land trailing back to the rear - to either side of a marketplace (West Oxon 2013: 22).

6.2.5 Post-medieval, Industrial and Modern periods

The post-medieval period is an age of transition and deep rooted change between the medieval world and the agricultural and industrial revolutions of the 18th and early 19th century..

A post-medieval windmill is recorded close to the Cross Hands Lane/A44 junction (MWA3815), with another near the Rollright Stones monuments (MOX8489).

The character of the town centre of Chipping Norton reflects later post-medieval and industrial prosperity, based on the agricultural landscape. The extensive remodelling of buildings fronting the Market Place to give them fashionable 18th century facades demonstrates this prosperity. The remodelling and the new buildings, such as the Town Hall, give the Market Place its character.

The expansion of the road network in the later 18th and earlier 19th centuries supported turnpike roads and toll houses, including the road from Long Compton to Chapel House (MWA30036) and its toll house at Compton Hill (MWA30037).

The railway was a 19th century innovation that improved the town's connections to the wider world and remains of the line are extant on the north side of Chipping Norton.

The Chipping Norton Union Workhouse is located on the north side of London Road, just east of the junction with Horse Fair. It occupied a large compound and was built on Benthamite principles of the Panopticon. Its location suggests deliberate siting to dominate and cow the rural working class of the area, as can be seen at other locations, such as Brighton and Devizes. It was repurposed as a hospital, following the creation of the National Health Service in 1947.

An American B24 Liberator bomber crashed approximately 560m north of Cross Hands Lane, at NGR SP27202989, on 6th of June 1943. This aircraft belonged to 409 Bomber Squadron (NRHE 42-63762). The remains are protected by the 1986 Protection of Military Remains Act.

6.2.6 Undated

An undated cropmark enclosure was identified north of Turnpike Hill Barn (MWA20336).

7. Cultural Heritage

7.1 Folklore

The Rollright Stones are a significant focus for myth and legend. This is not unusual for megalithic monuments, which were poorly understood in the pre-Modern era and appear to have attracted stories to explain them (Brown, 1999: 260-261; Westwood & Simpson 2006: 798).

Folktales relate that a war band, their king and a group of his knights that were turned to stone by a witch (sometimes identified as Mother Shipton), leaving the King's Men stone circle, the Whispering Knights, and the King Stone, as megalithic remains. The legends have a pedigree from the 12th century (Rollright Trust 2020a) and appear in Camden's *Britannia* of 1586 (Westwood & Simpson 2006: 593-594). Other legends claim that it is impossible to correctly count the stones in the main circle, and that anyone moving the stones will suffer (Ibid.). Meanwhile, an 1895 tale recorded that local man Will Hughes saw faeries emerging from a hole in the ground and dancing round the King Stone. The story also reports that his widow Betsy knew the location of the hole because she and her childhood playmates used to keep a stone over it (Old Weird Britain, 2020).

7.2 Intangible Cultural Heritage

7.2.1 Religious Practice and Earth Mysteries

The Rollright Stones have become the focus for a range of Pagan, neo-Pagan and New Age beliefs and practices, including Druidry, Wicca and dowsing. It is said to have a pedigree of ritual activity from the Pagan Revival in the 1950s. The site remains a popular location for ritual practice and is regarded as a meaningful place for many, on account of atmosphere, tranquillity and identified antiquity (Blain & Wallis, 2007: 178-179). They can be booked for private rituals, ceremonies and celebrations such as namings, birthdays, handfasting's and weddings and is also regularly booked for religious use, including the seasonal celebrations to mark pagan festivals, such as Imbolc and Beltane (Rollright Trust 2020).

The site has attracted a good deal of interest from earth mystery researchers and is said to be the focus of several ley lines. The site's associations with such theories originate with Alfred Watkins, who formulated/invented the concept of ley lines, in the early 20th century (Blain & Wallis, 2007: 180).

7.2.2 Popular Culture

The Rollright Stones has been the inspiration for authors including Terry Pratchett (Brown 2002: 68). It has been featured in TV productions, including Dr Who (1978) and Father Brown (2015).

The myths of the witch cursing the king and his knights, as well as that of the uncountable stones, appear in the third of Hilary Mantell's novels about the life of Thomas Cromwell (Mantell, 2020: 844-845)

The Stones are a popular location for astronomy, and there are annual open-air theatre productions of Shakespeare plays. It has also been the locations for site-specific sculpture (Rollright Trust 2020).

8. Aerial Photographs

Available aerial photographs were consulted on the Britain from Above website (BFA2020), alongside Google Earth Pro. The National Collection of Aerial Photography was searched but included no imagery of the search area.

The Britain From Above website includes a number of images the town centre in 1953. The historic core of the town appears essentially similar to the present day. No imagery was available showing the Workhouse/Hospital (BFA 2020). Britain From Above included no imagery relating to Cross Hands Lane.

Imagery available of Google Earth Pro was available from 1945 onwards. The 1945 imagery shows the developed, historic core of the town, with the hospital to the north-east. By 2004, there has been urban expansion, including development of the hospital site.

The 1945 imagery for Cross Hands Lane shows the realignment works of the western end of the lane, with a works compound at the pub.

The December 2004 imagery shows what appear to be cropmarks relating to Prehistoric field systems recorded south of Windmill Cottages and a linear feature north of the lane, opposite the cottages. These features are not visible on later imagery but are known from other sources and are recorded on the NRHE (1075331).

The plantation north-west of Brighthill Farm is shown as a new feature on the 1999 imagery and can be seen developing on subsequent air photographs.

All available images show the Rollright Stones monument group.

9. LiDAR data

No LiDAR coverage was available for either element of the route.

10. Historic Mapping

A selection of historic maps was viewed on the National Library of Scotland website. Due to copyright issues it has not been possible to reproduce those images here.

The Ordnance Survey Six Inch First Edition map of Chipping Norton (Map XIV.SE, dated 1900) shows the High Street, Market Place and Horse Fair, leading to London Road. The town centre is already highly developed, as might be expected from the post-medieval dates of many of the buildings surrounding the marketplace and the roads. This situation remains broadly unchanged to the present day. The exception to this stable situation is the site of the Union Workhouse. In 1900, the Workhouse is depicted as a significance complex on the north side of London Road, as it is in 1922 (XIV.11). The site is shown as Cotshill Hospital by 1955 (SP32NW, 1955). The site has subsequently been developed but the original, central building survives.

The Ordnance Survey Six Inch First Edition map (XIV.NW, 1900) shows the Cross Hands public house on south side of Cross Hands Lane as it joins the A44. The same map also shows and names the King Stone, Whispering Knights and the King's Men of the Rollright Stones group. Open fields bound the road on both sides along its route. Twinbrook Farm and Windmill Cottages and the buildings adjacent to them are not shown on the OS First Edition, nor is the large plantation east of Windmill Cottages and separating them from Little Rollright. The situation remains unchanged on the 25 Inch Second Edition (Oxfordshire XIV, 1905).

The Ordnance Survey 1:10,560 map(SP22NE, 1955) shows the western end of Cross Hands Lane realigned to its modern route, running south of the Cross Hands public house but the wider situation remains the same, saving the construction of Windmill Cottages.

11. Heritage Potential and Impacts

11.1 Heritage Potential

11.1.1 High Street

The High Street, Market Place and Horse Fair represent the core of the historic settlement, with the medieval burgage plots fronting the marketplace. This planned element of the town is believed to date to the 13th century and its basic plan has endured to the present day. There has been post-medieval and early modern redevelopment and remodelling of buildings fronting the route, as well as some new building; many of those older buildings are listed or locally listed. The archaeological potential of the town remains high, with potential for the survival of deposits and features from at least the 13th century around the marketplace, and for earlier remains to the north, near the castle and church.

11.1.2 Cross Hands Lane

Cross Hands Lane follows a route on the ridge that includes the Chastleton Barrow hillfort, the Neolithic monuments sites west of the junction with the A44, the extensive Romano-British cropmark remains, the Rollright Stones monuments and the associated barrow cemetery, Iron Age settlement and Anglo-Saxon cemetery. The density of remains along the route demonstrates high archaeological potential, with those remains exhibiting sensitivity and high significance, particularly around the cluster of Scheduled heritage assets and associated sites around the stones. This area, in particular, demonstrates high significance and sensitivity with the particular ritual/ceremonial/funerary focus to a high proportion of the recorded assets, including the Rollright Stones, the Anglo-Saxon cemetery, and the extensive barrow cemetery; however, the Romano-Celtic temple and Neolithic sites to the west, suggest a wider ceremonial/sacral use of the ridge.

While the identified cluster of archaeological remains focussing on the Rollright Stones represents the area of highest archaeological potential, the Romano-British field systems indicate extensive agricultural activity in the wider landscape that will have its origins in the later Iron Age. Meanwhile, the temple site indicates other human activity during this period. As a result, there is identified potential for later Iron Age and Roman settlement where the population working the fields lived. Similarly, there is currently no identified settlement for the people burying their dead in the Anglo-Saxon cemetery close to the stone circle.

As a result of the density of identified archaeological assets, there is likely to be high potential for previously unidentified remains to be present.

11.2 Potential Impacts

11.2.1 Chipping Norton

The buildings fronting onto the proposed route are within the Conservation Area, and the individual listed and locally listed buildings within it are of high significance. They are likely to be Substantial impacts on the Conservation Area itself and to the Setting of the of individual assets within it. Setting includes the experience, understanding and appreciation of the heritage assets that contribute to its significance. Increased traffic has potential to impact upon the setting of the Conservation Area and the individual designated buildings through increased noise, visual effects of increased HGV usage of the route and potential for diminished air quality. Any works directly affecting listed buildings will require listed building consent if they attach to or physically impact upon the building.

Any works to improve or upgrade the route within the town is likely to have Substantial direct effects on the heritage resource. The identified high medieval origin of the planned town means that there are likely to be archaeological deposits present. While the marketplace itself may be considered to have been open space since the middle ages, there remains potential for structural remains. Meanwhile, any direct effects on

buildings could expose the structural narrative of construction and remodelling, while demolition would expose any archaeological deposits currently beneath the building.

11.2.2 Cross Hands Lane

There is high potential for Substantial adverse impacts on buried archaeological deposits either side of Cross Hands Lane, in the event of road widening. This potential includes both recorded, and any previously unidentified features and deposits.

There is also high potential for Substantial adverse impact on the setting of the Rollright Stones monument group. Impacts on the setting of the monuments from increased traffic, including noise, light during the hours of darkness, and any reduction in air quality, would have the potential to impact upon its significance, through adverse effects on the contribution to the experience, understanding and appreciation of the monument coming from its setting. While setting is not defined in Scheduling legislation, in the way that it is for listed buildings, NPPF identifies it as a material consideration.

11.2.3 No Identified Effects

The Grade II Cornwell Park, the Grade I listed Parish Church and the Scheduled Chipping Norton Castle are all considered to be at sufficient distance from the two elements of the scheme, and are screened by intervening buildings and/or vegetation, so that the effects of the proposals on their settings are considered to be, at most, Negligible.

11.3 Potential Project Risk

The Substantial scale of potential impacts on the Rollright Stones has potential to pose significant risk to the proposed project. The negative effects of development on the setting of the Rollright Stones has potential to form a significant public objection to intensification of road use and may also attract adverse comment from Historic England.

12. Mitigation Recommendations and Conclusions

12.1 Designated Heritage Assets

This study has identified significant potential for adverse effects on the settings of heritage assets along both routes. Both routes are already busy with all traffic, including HGV, but existing adverse effects on heritage assets do not negate the requirement for further assessment. Historic England guidance (2017: 4) states that "Where the significance of a heritage asset has been compromised in the past by unsympathetic development affecting its setting, to accord with NPPF policies, consideration still needs to be given to whether additional

change will further detract from, or can enhance, the significance of the asset." The guidance also acknowledges that "Settings of heritage assets change over time" but identifies that "Understanding this history of change will help to determine how further development within the asset's setting is likely to affect the contribution made by setting to the significance of the heritage asset." (ibid.).

Any direct effects on designated assets will require either Listed Building or Scheduled Monument consent. Consents relating to Scheduled Monuments and buildings listed at Grades I and II* should be discussed with Historic England, while works affecting grade II listed buildings should be discussed with the Conservation Officer within the local planning authority.

The potential for adverse effects on designated heritage is such that early engagement with Historic England and the Conservation Officer is recommended, if this has not already begun.

12.2 Archaeological Remains

There is identified potential for adverse impacts on recorded archaeological sites, as well as for the identification of previously unknown archaeological remains. As a result, early engagement with the archaeological adviser to the local planning authority is recommended. Meanwhile, the proximity to the border with Warwickshire, and that this study has identified remains on the Warwickshire HER within the search area, supports engagement with their archaeological curator.

The following evaluation and assessment methods should be considered:

- Archaeological Desk-Based Assessment.
- Settings Assessment.
- Geophysical survey within the Cross Hands Lane route corridor, and
- Archaeological evaluation trenching.

Further mitigation works would be defined based on the results of any such assessments.

Any further archaeological work should be undertaken in agreement with the relevant curatorial specialists (County archaeological advisers, Historic England, conservations officers) and should be undertaken in accordance with the standards and guidance from the Chartered Institute for Archaeologists and Written Schemes of Investigation, or similar method statements, agreed in advance with the relevant curator.

These assessment methods should also be employed for any alternative HGV routes proposed.

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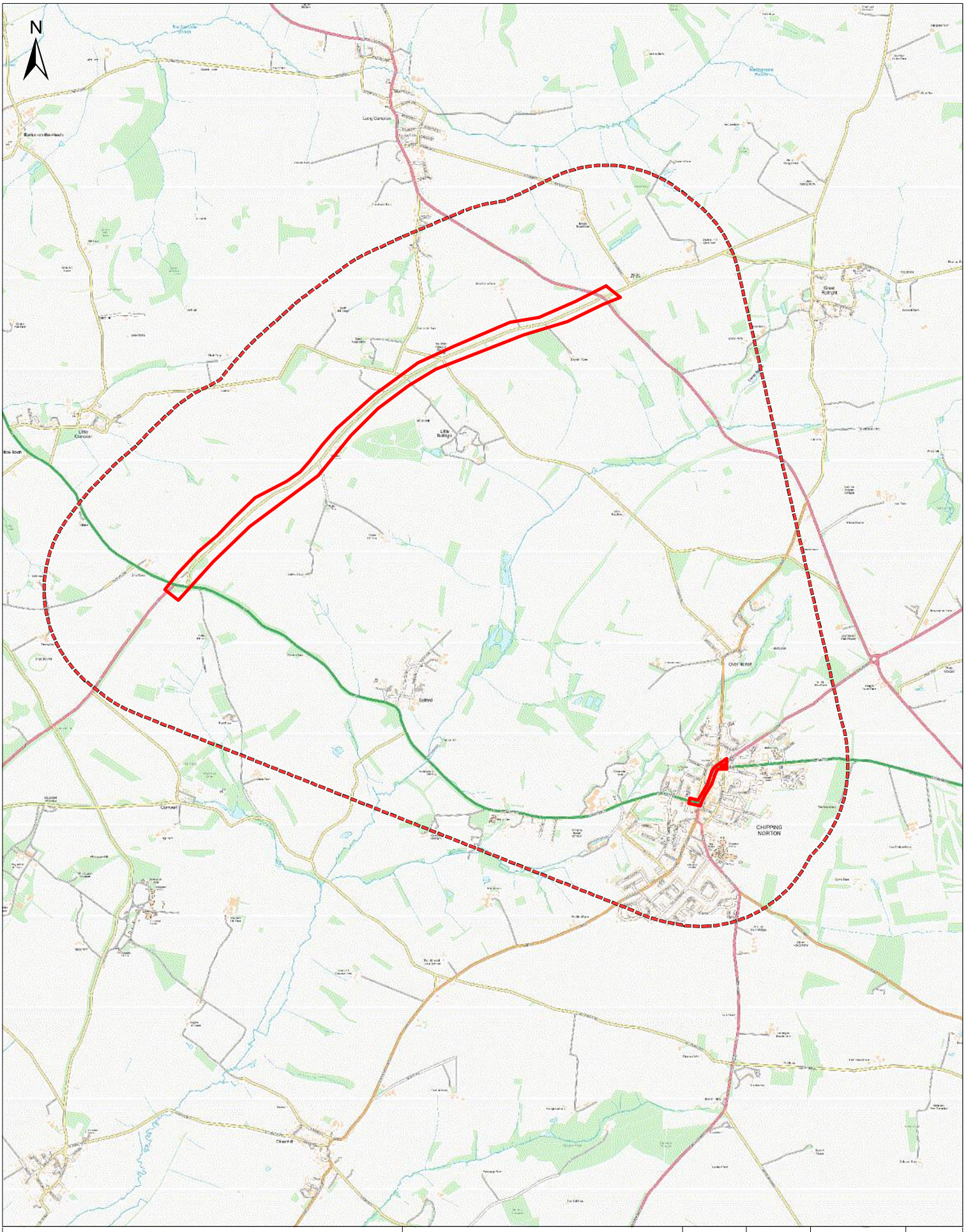
Appendices

Appendix A – Site Location Plan



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Sheet Size: **A4** Scale of Original: **1:40,000**

Client: Oxfordshire County Council

Project: Chipping Norton HGV Assessment

SJH	MB	August 2020	V1
Created:	Checked:	Date:	Version:

Title: Site Location Plan

Office:	Project No:	Figure No:
4154	A118418	1

Appendix B – Assessment Methodology

Historic Environment Impact Assessment Methodology

WYG's evaluation and assessment criteria have been developed using a combination of the Secretary of State's criteria for Scheduling Monuments (Scheduled Monument Statement, Annex 1), Design Manual for Roads and Bridges, Volume 11, Part 3, Section 2, HA 208/07 and Transport Analysis Guidance (TAG Unit 3.3.9, Heritage of Historic Resources Sub-Objective). Professional judgement is used in conjunction with these criteria to undertake the impact assessment, as well as complimentary good practice guidance including Historic England's Conservation Principles (**Evidential**, **Historical**, **Aesthetic** and **Communal**).

Value

The table below provides guidance on the assessment of significance for all types of heritage assets, including archaeological sites and monuments, historic buildings, historic landscapes and other types of historical site, such as battlefields, parks and gardens. The table considers both designated and non-designated heritage assets.

Value	Examples
Very High	World Heritage Sites, Scheduled Monuments of exceptional quality, or assets of acknowledged international importance or assets that can contribute to international research objectives. Grade I Listed Buildings and built heritage of exceptional quality. Grade I Registered Parks and Gardens and historic landscapes and townscapes of international sensitivity, or extremely well-preserved historic landscapes and townscapes with exceptional coherence, integrity, time-depth, or other critical factor(s).
National/ High	Scheduled Monuments, or assets of national quality and importance or assets that can contribute to national research objectives. Grade II* and Grade II Listed Buildings, Conservation Areas with very strong character and integrity, other built heritage that can be shown to have exceptional qualities in their fabric or historical association. Grade II* and II Registered Parks and Gardens, Registered Battlefields and historic landscapes and townscapes of outstanding interest, quality and importance, or well preserved and exhibiting considerable coherence, integrity time-depth or other critical factor(s).
Regional/ Medium	Designated or undesignated assets of regional quality and importance that contribute to regional research objectives. Grade II Listed Buildings of modest preservation or integrity. Locally Listed Buildings, other Conservation Areas, historic buildings that can be shown to have good qualities in their fabric or historical association. Grade II Registered Parks and Gardens and Registered Battlefields of poorer preservation or integrity. Designated or undesignated special historic landscapes and townscapes with reasonable coherence, integrity, time-depth or other critical factor(s).

Value	Examples
	Assets that form an important resource within the community, for educational or recreational purposes.
Local/ Low	Undesignated assets of local importance. Assets compromised by poor preservation and/or poor survival of contextual associations but with potential to contribute to local research objectives. Historic (unlisted) buildings of modest quality in their fabric or historical association. Historic landscapes and townscapes with limited sensitivity or whose sensitivity is limited by poor preservation, historic integrity and/or poor survival of contextual associations. Assets that form a resource within the community with occasional utilisation for educational or recreational purposes.
Negligible	Assets with very little or no surviving cultural heritage interest. Buildings of no architectural or historical note. Landscapes and townscapes that are badly fragmented and the contextual associations are severely compromised or have little or no historical interest.

Impact

The magnitude of the potential impact is assessed for each site or feature independently of its significance. Magnitude is determined by considering the predicted deviation from baseline conditions. The magnitude of impact categories are adapted from the Transport Assessment Guidance (TAG Unit 3.3.9) and Design Manual for Roads and Bridges, Volume 11, Part 3, Section 2, HA 208/07.

Impact	Typical Criteria Descriptors
Substantial	Impacts will act to damage or destroy cultural heritage assets; result in the loss of the asset and/or quality and integrity; cause severe damage to key characteristic features or elements; almost complete loss of setting and/or context of the asset. The assets integrity or setting is almost wholly destroyed or is severely compromised, such that the resource can no longer be appreciated or understood. (Negative). The proposals would remove or successfully mitigate existing damaging and discordant impacts on assets; allow for the restoration or enhancement of characteristic features; allow the substantial re-establishment of the integrity, understanding and setting for an area or group of features; halt rapid degradation and/or erosion of the heritage resource, safeguarding substantial elements of the heritage resource. (Positive).
Moderate	Substantial impact on the asset, but only partially affecting the integrity; partial loss of, or damage to, key characteristics, features or elements; substantially intrusive into the setting and/or would adversely impact upon the context of the asset; loss of the asset for community appreciation. The assets integrity or setting is damaged but not destroyed so understanding and appreciation is compromised. (Negative).

Impact	Typical Criteria Descriptors
	Benefit to, or restoration of, key characteristics, features or elements; improvement of asset quality; degradation of the asset would be halted; the setting and/or context of the asset would be enhanced and understanding and appreciation is substantially improved; the asset would be bought into community use. (Positive).
Slight	Some measurable change in assets quality or vulnerability; minor loss of or alteration to, one (or maybe more) key characteristics, features or elements; change to the setting would not be overly intrusive or overly diminish the context; community use or understanding would be reduced. The assets integrity or setting is damaged but understanding and appreciation would only be diminished not compromised. (Negative). Minor benefit to, or partial restoration of, one (maybe more) key characteristics, features or elements; some beneficial impact on asset or a stabilisation of negative impacts; slight improvements to the context or setting of the site; community use or understanding and appreciation would be enhanced. (Positive).
Negligible / No Change	Very minor loss or detrimental alteration to one or more characteristics, features or elements. Minor changes to the setting or context of the site. No discernible change in baseline conditions (Negative). Very minor benefit to or positive addition of one or more characteristics, features or elements. Minor changes to the setting or context of the site No discernible change in baseline conditions. (Positive).

Magnitude (scale of change) is determined by considering the predicted deviation from baseline conditions. Quantifiable assessment of magnitude has been undertaken where possible. In cases where only qualitative assessment is possible, magnitude has been defined as fully as possible.

Any embedded mitigation is considered in the impact assessment and this is clearly described in this section (cross referring the development description). Therefore, the magnitude of the impacts described in the impact assessment will be considered stated before and after additional mitigation has been taken into account.

Impacts may be of the following nature and will be identified as such where relevant:

- Negative or Positive.
- Direct or indirect.
- Temporary or permanent.
- Short, medium or long term.
- Reversible or irreversible.

- Cumulative.

For the purposes of this Heritage Impact Assessment, substantial negative impacts are considered to amount to 'substantial harm' to designated heritage assets in National Planning Policy Framework (NPPF) terms. Moderate-slight negative impacts to designated heritage assets are considered to be 'less than substantial harm' in NPPF terms. Negligible negative impacts/no change are not considered to amount to any material harm to designated heritage assets.

Appendix C – Report Conditions

Archaeological and Heritage Assessment, Chipping Norton HGV Route

This report is produced solely for the benefit of **Oxfordshire County Council** and no liability is accepted for any reliance placed on it by any other party unless specifically agreed by us in writing.

This report is prepared for the proposed uses stated in the report and should not be relied upon for other purposes unless specifically agreed by us in writing. In time technological advances, improved practices, fresh information or amended legislation may necessitate a re-assessment. Opinions and information provided in this report are on the basis of WYG using reasonable skill and care in the preparation of the report.

This report refers, within the limitations stated, to the environment of the site in the context of the surrounding area at the time of the inspections. Environmental conditions can vary and no warranty is given as to the possibility of changes in the environment of the site and surrounding area at differing times.

This report is limited to those aspects reported on, within the scope and limits agreed with the client under our appointment. It is necessarily restricted and no liability is accepted for any other aspect. It is based on the information sources indicated in the report. Some of the opinions are based on unconfirmed data and information and are presented accordingly within the scope for this report.

Reliance has been placed on the documents and information supplied to WYG by others, no independent verification of these has been made by WYG and no warranty is given on them. No liability is accepted or warranty given in relation to the performance, reliability, standing etc of any products, services, organisations or companies referred to in this report.

Whilst reasonable skill and care have been used, no investigative method can eliminate the possibility of obtaining partially imprecise, incomplete or not fully representative information. Any monitoring or survey work undertaken as part of the commission will have been subject to limitations, including for example timescale, seasonal, budget and weather related conditions.

Although care is taken to select monitoring and survey periods that are typical of the environmental conditions being measured, within the overall reporting programme constraints, measured conditions may not be fully representative of the actual conditions. Any predictive or modelling work, undertaken as part of the commission will be subject to limitations including the representativeness of data used by the model and the assumptions inherent within the approach used. Actual environmental conditions are typically more complex and variable than the investigative, predictive and modelling approaches indicate in practice, and the output of such approaches cannot be relied upon as a comprehensive or accurate indicator of future conditions.

The potential influence of our assessment and report on other aspects of any development or future planning requires evaluation by other involved parties.

The performance of environmental protection measures and of buildings and other structures in relation to acoustics, vibration, noise mitigation and other environmental issues is influenced to a large extent by the degree to which the relevant environmental considerations are incorporated into the final design and specifications and the quality of workmanship and compliance with the specifications on site during construction. WYG accept no liability for issues with performance arising from such factors.

September 2020

WYG Environment Planning Transport Ltd

Appendix F – Highway Boundaries

DO NOT SCALE: CONTRACTOR TO CHECK ALL DIMENSIONS AND REPORT ANY OMISSIONS OR ERRORS

Legend:

Indicative extent of highway boundary based on data supplied by OCC.

REV	DESCRIPTION	BY	CHK	APP	DATE

Client:

Oxfordshire County Council

EXECUTIVE PARK
AVALON WAY
ANSTEY
LEICESTER
LE7 7GR
TEL: +44 (0)116 234 8000
FAX: +44 (0)116 234 8001
e-mail: leicester@wyg.com

Project:

Chipping Norton

Drawing Title:

Highway Boundary
(Drawing 1 of 9)

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Cut Line

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Project:
Chipping Norton

Drawing Title:
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(Drawing 2 of 9)

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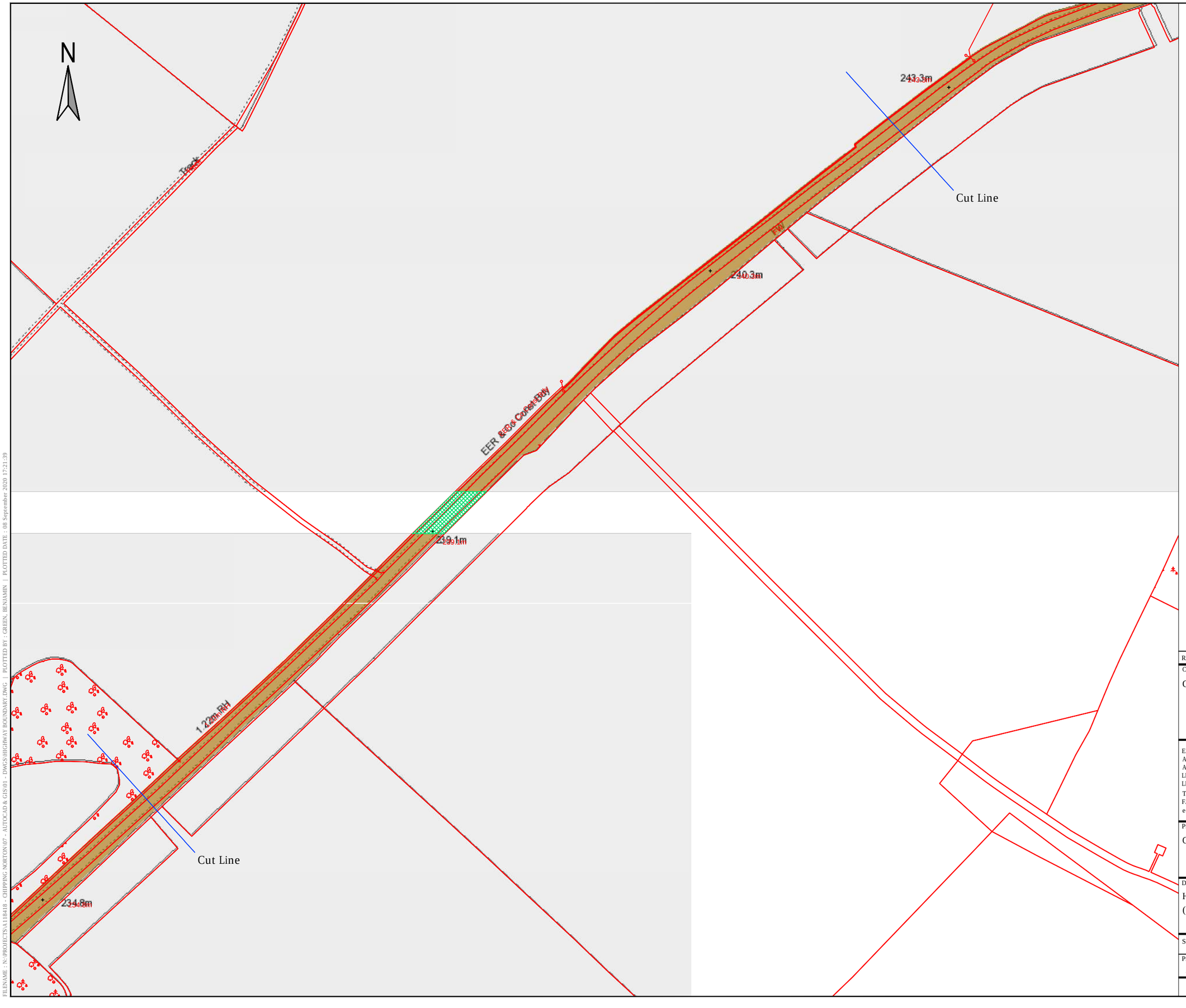

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- Indicative extent of highway boundary based on data supplied by OCC.

REV	DESCRIPTION	BY	CHK	APP	DATE

Client:

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EXECUTIVE PARK
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Project:

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Drawing Title:

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(Drawing 3 of 9)

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229.5m

Windmill Farm

Weighbridge

Windmill Cottages

235.5m

Cut Line

237.7m

241.0m

242.5m

243.3m

Cut Line

Twin Brook Farm

231.6m

Taylor Hill Farm

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Indicative extent of highway boundary based on OS base mapping.

Indicative extent of highway boundary based on data supplied by OCC.

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Client:

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Drawing Title:

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(Drawing 4 of 9)

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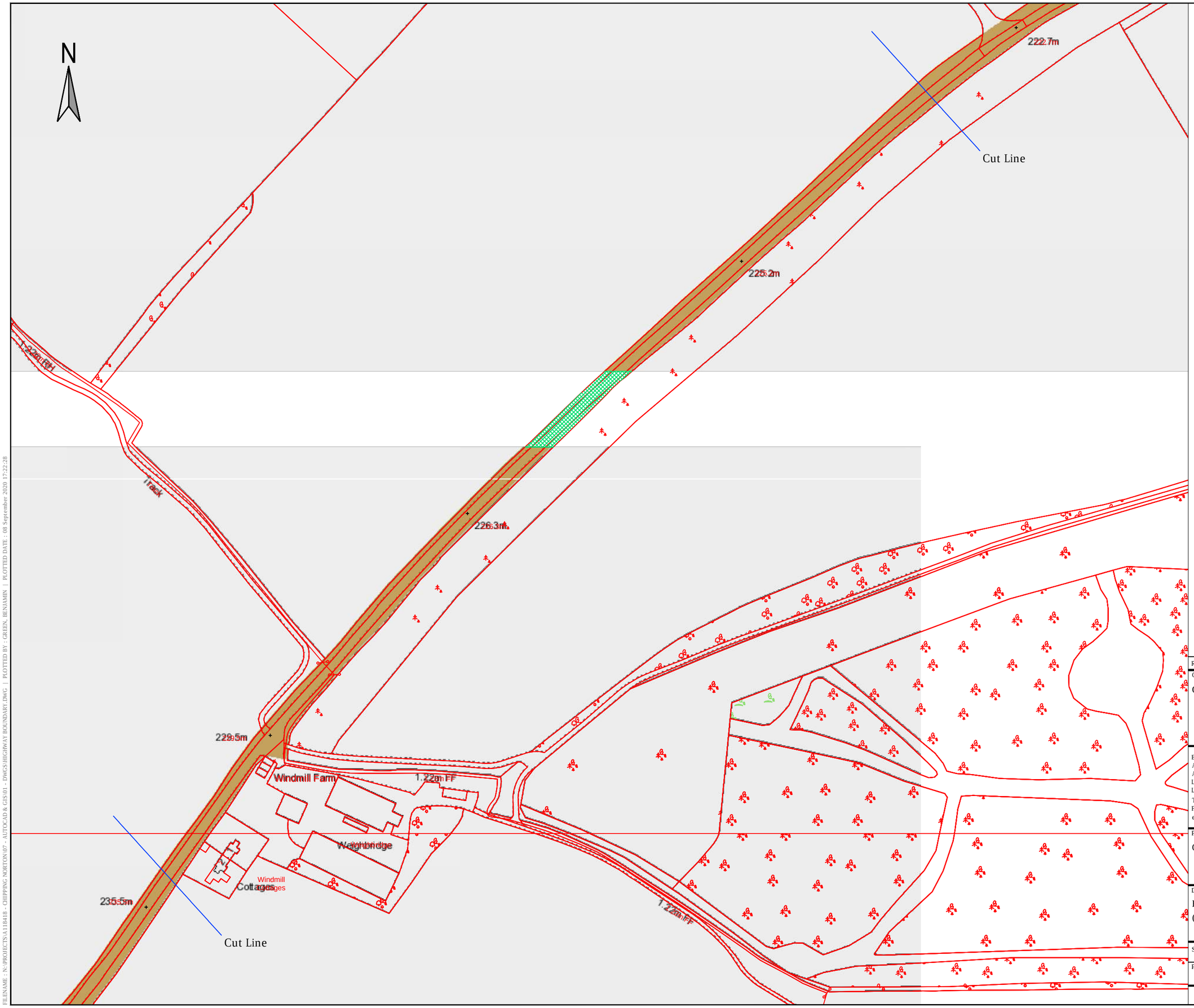

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REV	DESCRIPTION	BY	CHK	APP	DATE

Client:

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Drawing Title:

Highway Boundary
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Indicative extent of highway boundary based on data supplied by OCC.

REV	DESCRIPTION	BY	CHK	APP	DATE

Client:

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Drawing Title:

Highway Boundary
(Drawing 6 of 9)

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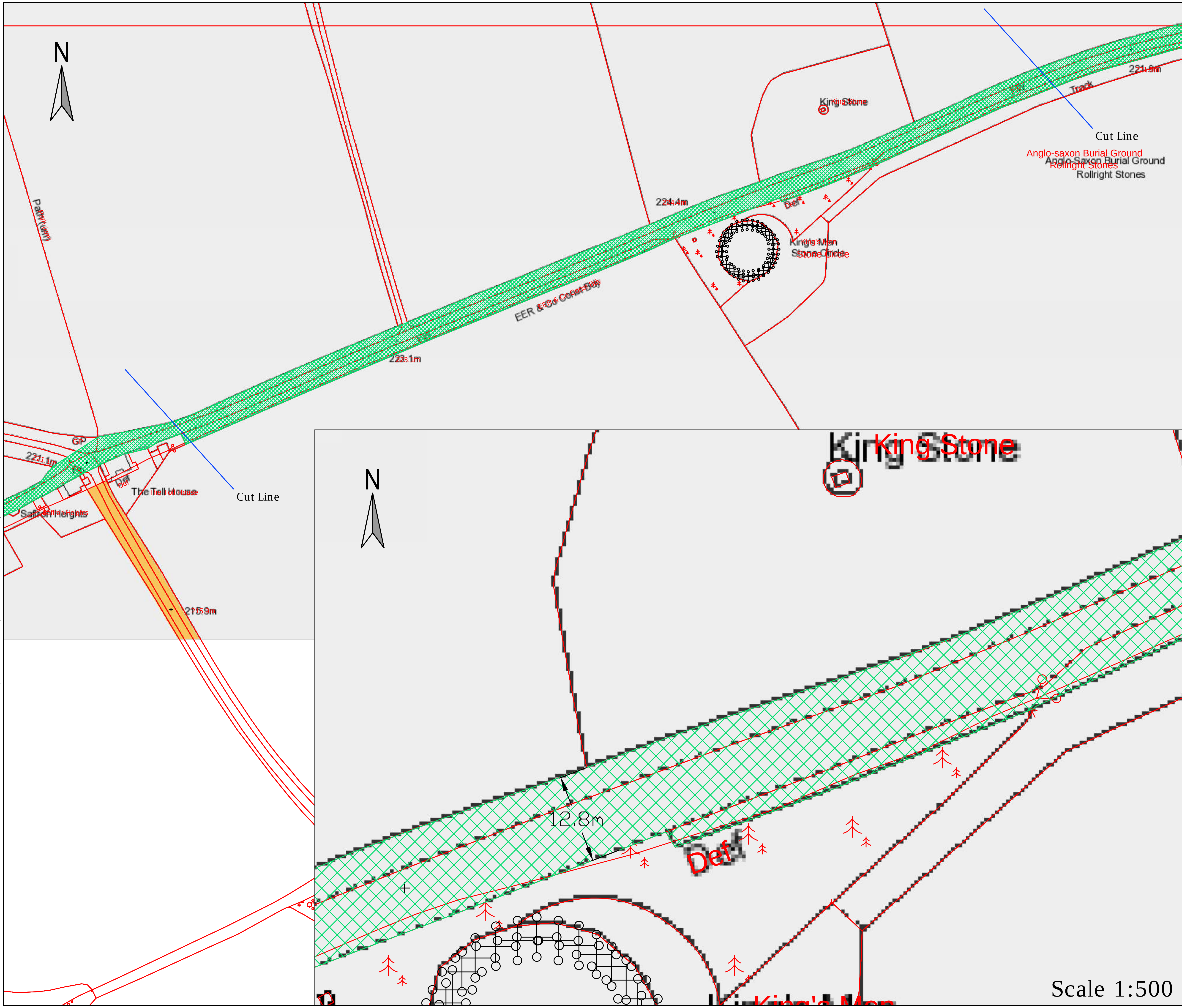

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Indicative extent of highway boundary based on data supplied by OCC.

REV	DESCRIPTION	BY	CHK	APP	DATE

Client:

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Project:

Chipping Norton

Drawing Title:

Highway Boundary
(Drawing 7 of 9)

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Client:
Oxfordshire County Council

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Project:
Chipping Norton

Drawing Title:
Highway Boundary
(Drawing 8 of 9)

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Legend:

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Indicative extent of highway boundary based on data supplied by OCC.

REV	DESCRIPTION	BY	CHK	APP	DATE

Client:

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Drawing Title:

Highway Boundary
(Drawing 9 of 9)

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Appendix G – Constraints Plan

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Iron Age enclosed settlement and part of a trackway 150m north east of the King Stone

The Rollright Stones

Warwickshire

Oxfordshire

Cross Hands Quarry

Portal dolmen 400m south east of Burnt Hill

Neolithic long barrow 400m SSE of Burnt Hill

Great house site, garden earthworks and associated remains immediately north, west and south of St Mary's Church

CORNWELL MANOR

Over Norton bowl barrow 150m north west of the intersection between the A361 and the A34(T)

Chipping Norton motte and bailey castle, and fishpond

Glyme Valley

0 0.5 1 1.5 2 Km

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Legend

- County Boundary
- Listed Building
- Scheduled Monuments
- Areas of Outstanding Natural Beauty (AONB)
- Sites of Special Scientific Interest (SSSI)
- Parks and Gardens
- Countryside and Rights of Way (CRoW) Act 2000 Access Layer
- Flood Zone 3
- Flood Zone 2

Public Rights of Way

- Footpath
- Bridleway
- Restricted Byway

REV	DESCRIPTION	BY	CHK	APP	DATE

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Drawing Title:
Constraints Map

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
NTS	BG	08.09.20	JP	08.09.20	JP	08.09.20

Project No.	Office	Type	Drawing No.	Revision
A118418	35	18	010	-

Appendix H – Option Appraisal Summary

Policy Fit

Option	Scheme Details	Policy Area			
		Impact on Air Quality	Impact on historic built environment	Impact on wider heritage assets	Total
1	Re-routing via Rollright Stones unclassified road	✓	✓	××	0
2	Re-routing south of Rollright Stones	✓	✓	×	1
3	Re-routing north of Rollright Stones	✓	✓	×	1
4	Re-routing via eastern development link	✓	✓	±	2
5	Reclassification of A44	✓	✓	±	2
6	Weight restriction on A361	✓	✓	±	2
7	Weight restriction on A361 and A3400	✓	✓	±	2
8	Weight restriction on Rollright Stones unclassified road	×	×	✓	-1

Connectivity

Option	Scheme Details	Connectivity Criteria				
		Severance	Pedestrian Delay	Pedestrian amenity	Pedestrian fear and intimidation	Total
1	Re-routing via Rollright Stones unclassified road	±	±	✓	✓	2
2	Re-routing south of Rollright Stones	±	±	✓	✓	2
3	Re-routing north of Rollright Stones	±	±	✓	✓	2
4	Re-routing via eastern development link	±	±	✓	✓	2
5	Reclassification of A44	±	±	✓	✓	2
6	Weight restriction on A361	±	±	±	✓	1
7	Weight restriction on A361 and A3400	±	±	±	✓	1
8	Weight restriction on Rollright Stones unclassified road	±	±	±	×	-1

Reliablity

Option	Scheme Details	Reliability Criteria		
		Change in flow at New Street / West End Junction	Change in flow at London Road / Banbury Road / Horsefair / Over Norton Road junction	Total
1	Re-routing via Rollright Stones unclassified road	-215	-215	2
2	Re-routing south of Rollright Stones	-215	-215	2
3	Re-routing north of Rollright Stones	-215	-215	2
4	Re-routing via eastern development link	-111 (HGV) -926 (Cars)	-111 (HGV) -926 (Cars)	4
5	Reclassification of A44	-370	-370	2
6	Weight restriction on A361	-148	-148	2
7	Weight restriction on A361 and A3400	-148	-148	2
8	Weight restriction on Rollright Stones unclassified road	45	45	-2

Deliverability

Option	Scheme Details	Deliverability Criteria	
		Requirements for third party land	Total
1	Re-routing via Rollright Stones unclassified road	Third party land likely to be required at several pinch-points, including potential realignment passing Saffron Heights	-1
2	Re-routing south of Rollright Stones	Third party land required as per Option 1, but with the additional land required for Rollright Stones southern bypass	-2
3	Re-routing north of Rollright Stones	Third party land required as per Option 1, but with the additional and required for the Rollright Stones northern bypass	-2
4	Re-routing via eastern development link	Land required within the Eastern Development site (subject to junction works at either end of the link)	0
5	Reclassification of A44	No land requirement	1
6	Weight restriction on A361	No land requirement	1
7	Weight restriction on A361 and A3400	No land requirement	1
8	Weight restriction on Rollright Stones unclassified road	No land requirement	1

Cross Boundary

Option	Scheme Details	Cross Boundary Matters		
		Requirement for physical works in adjacent authority areas	Potential for re routing through adjacent authority areas	Total
1	Re-routing via Rollright Stones unclassified road	×	×	-2
2	Re-routing south of Rollright Stones	±	±	0
3	Re-routing north of Rollright Stones	××	××	-4
4	Re-routing via eastern development link	±	±	0
5	Reclassification of A44	±	×	-1
6	Weight restriction on A361	±	×	-1
7	Weight restriction on A361 and A3400	±	×	-1
8	Weight restriction on Rollright Stones unclassified road	±	±	0

Air Quality

Option	Scheme Details	Air Quality Criteria			
		Max Change in NO_2 Levels ($\mu g/m^3$)	Max Change in PM_{10} Levels ($\mu g/m^3$)	Max Change in $PM_{2.5}$ Levels ($\mu g/m^3$)	Total
1	Re-routing via Rollright Stones unclassified road	-1.91	-0.5	-0.29	3
2	Re-routing south of Rollright Stones	-1.91	-0.5	-0.29	3
3	Re-routing north of Rollright Stones	-1.91	-0.5	-0.29	3
4	Re-routing via eastern development link	-2.3	-0.76	-0.45	3
5	Reclassification of A44	N/A	N/A	N/A	3
6	Weight restriction on A361	-1.31	-0.34	-0.2	0
7	Weight restriction on A361 and A3400	-1.31	-0.34	-0.2	0
8	Weight restriction on Rollright Stones unclassified road	0.41	0.11	0.06	-3

Archaeology and Heritage

Option	Scheme Details	Archaeology and Heritage Criteria			
		Impact on Scheduled Ancient Monument	Potential for wider archaeological impacts	Impact on Conservation Area	Total
1	Re-routing via Rollright Stones unclassified road	××	××	✓	-3
2	Re-routing south of Rollright Stones	±	×	✓	0
3	Re-routing north of Rollright Stones	±	×	✓	0
4	Re-routing via eastern development link	±	±	✓	1
5	Reclassification of A44	±	±	✓	1
6	Weight restriction on A361	✓	✓	✓	3
7	Weight restriction on A361 and A3400	✓	✓	✓	3
8	Weight restriction on Rollright Stones unclassified road	✓	✓	×	2

Costs

Option	Scheme Details	Cost Criteria	
		Potential Scale of Costs	Total
1	Re-routing via Rollright Stones unclassified road	Range of costs between £6,950,000 - £14,950,000	-1
2	Re-routing south of Rollright Stones	Range of costs between £8,950,000 - £16,950,000	-2
3	Re-routing north of Rollright Stones	Range of costs between £8,950,000 - £16,950,000	-2
4	Re-routing via eastern development link	Would be delivered by third parties (however may be secondary costs with regards to directional signage)	0
5	Reclassification of A44	Costs not defined	0
6	Weight restriction on A361	Costs not defined	0
7	Weight restriction on A361 and A3400	Costs not defined	0
8	Weight restriction on Rollright Stones unclassified road	Costs not defined	0

Total Score

Option	Scheme Details	Policy Fit	Connectivity	Reliability	Deliverability	Cross Boundary	Air Quality	Archaeology and Heritage	Costs	Total
1	Re-routing via Rollright Stones unclassified road	0	2	2	-1	-2	3	-3	-1	0
2	Re-routing south of Rollright Stones	1	2	2	-2	0	3	0	-2	4
3	Re-routing north of Rollright Stones	1	2	2	-2	-4	3	0	-2	0
4	Re-routing via eastern development link	2	2	4	0	0	3	1	0	12
5	Reclassification of A44	2	2	2	1	-1	3	1	0	10
6	Weight restriction on A361	2	1	2	1	-1	0	3	0	8
7	Weight restriction on A361 and A3400	2	1	2	1	-1	0	3	0	8
8	Weight restriction on Rollright Stones unclassified road	-1	-1	-2	1	0	-3	2	0	-4