

Land at Draycott, Cam



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1 Project Information

1.1 Project Information

Client Persimmon Homes and Robert Hitchins

1.2 Project Details

Project Name Cam West of Draycott

Location Cam, Gloucestershire

Jubb Project Number 20158

1.3 Report Details

Version 3

Status Issue

Date May 2021

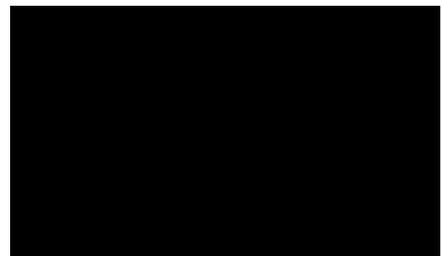
1.4 Project Authorisation

ISSUE HISTORY:

Version	Date	Detail
1	Apr 21	First Draft
2	May 21	Issue
3	May 21	Revised

AUTHORISATION:

Prepared By **Approved By**



2 Introduction

2.1 Preamble

2.1.1 Jubb have been appointed by Persimmon Homes Severn Valley and Robert Hitchens to provide highways and transportation advice in relation to a proposed residential led development at land west of the A4135 Draycott in Cam. The site is included as a draft site allocation within the Stroud District Council Local Plan Review Pre-Draft Submission (dated May 2021) which identifies it for the location of 900 dwellings, a primary school and associated infrastructure, landscaping, and community space. Details of the site location are set out in **Figure 2.1** below.

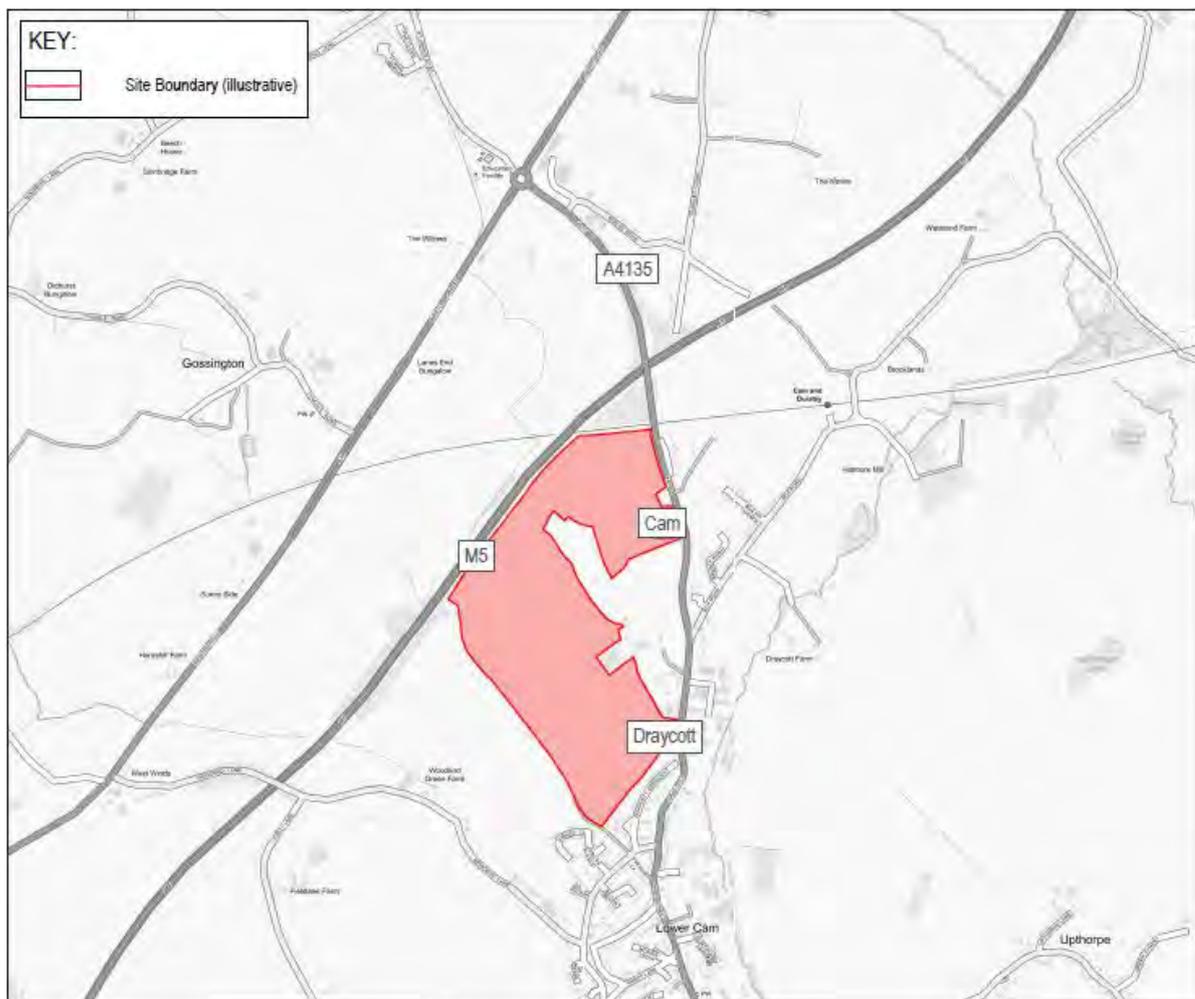


Figure 2.1 Site Location

2.1.2 This TA has been prepared in support of a planning application being made by Robert Hitchens Limited (northern part of the site) and another by Persimmon Homes (remainder of the site) with two identified options for the southern part of the site. These two options relate to a 'with school' and 'without school' scenario. The TA has therefore considered the whole development with the two options as set out below:

- *Option 1 – 1,030 residential units (if the land for a school is not required)*
- *Option 2 – 950 residential units and a 1.5 form entry school*

2.1.3 A Framework Plan is included for the whole site and a preliminary Illustrative Master Plan for the Persimmon section of the site are included at **Appendix A**.

2.1.4 This TA has been developed following a detailed review of a previously produced TA by Asbri Transport for a neighbouring mixed-use proposal on land north-east of Cam known as the Bathurst Ltd development (Ref: S.15_2804/OUT). It is noted that the Bathurst Ltd development received planning consent in December 2017 for the following:

- 450 dwellings;
- 10.7ha of employment land for use classes B1, B2 and B8;
- Open Space and landscaping including a flood storage pond and riverside park; and
- New vehicular access to Draycott and Box Road.

2.1.5 An initial scoping study has also been submitted to the Local Highway Authority (LHA), which is included as **Appendix B**. The analysis within this TA is based on this scoping study.

2.1.6 It is noted that Jubb are also in consultation with the LHA in relation to further modelling using the Gloucestershire County Wide Traffic Model. Further subsequent analysis will also be submitted to the LHA following use of this model.

2.2 Scope of Report

2.2.1 This TA examines the transport and highways matters pertinent to the site, and in doing so demonstrates the suitability of the site for residential development.

2.2.2 The structure of the TA is as follows:

- Section 3** Sets the proposals in the context of national and local policy and guidance;
- Section 4** Sets out the existing situation of the site, including the location of the site, accessibility, existing highway network, and highway safety;
- Section 5** Outlines the development proposals, including the parking and access arrangements for vehicles, pedestrians and cyclists;
- Section 6** Sets out baseline traffic assumptions that will form the basis of comparison when assessing development impact;
- Section 7** Outlines the assumptions used to calculate and assign development traffic;
- Section 8** Assesses the anticipated impact of the traffic generated by the proposed development on the highway network;
- Section 9** Examines the opportunities to promote sustainable travel;
- Section 10** Presents the summary and conclusions of the TA.

2.2.3 This TA demonstrates that the proposed development is not forecast to have a severe residual cumulative impact, in accordance with the policy of the National Planning Policy Framework (NPPF), on the highway network. Furthermore, an assessment of the site location also demonstrates that it is suitably located to be accessed by sustainable modes with appropriate connections to this network proposed as part of this development. Moreover, the proposed development would contribute towards Stroud District Council's housing need, providing much-needed housing in a sustainable location.

2.2.4 As such, it is considered that there are no highways or transport matters to prevent the proposals from being approved.

3 Transport Planning Policy

3.1 Introduction

3.1.1 This section outlines the national and local planning policies and guidance relevant to the proposed development. The following are set out:

- National Planning Policy Framework (2012)
- Planning Practice Guidance – Travel Plans, Transport Assessments and Statements (2014)
- Manual for Streets (2007);
- Manual for Gloucestershire Streets (July 2020);
- Gloucestershire's Local Transport Plan – 2015-41
- Stroud District Council's Local Plan (2015);
- Stroud District Local Plan Review – Pre-Submission Draft Plan (May 2021);
- Stroud Sustainable Transport Strategy (November 2019);
- Cam Parish Neighbourhood Plan 2019-2031.

3.1.2 This review sets the planning context for the proposals, and thereafter this TA demonstrates the suitability of the site in view of this context.

3.2 National Planning Policy Framework

3.2.1 The revised NPPF) was updated in February 2019 and replaces the previous NPPF. The document sets out the Government's planning policies for England and how these should be applied.

3.2.2 The NPPF states that the "purpose of the planning system is to contribute to the achievement of sustainable development", which itself is defined as "meeting the needs of the present without compromising the ability of future generations to meet their own needs". The NPPF is based on a "presumption in favour of sustainable development", as detailed in paragraph 11.

3.2.3 Considering transport, the NPPF guides that transport issues should be considered at the earliest stage of development proposals. It is noted that "*The planning system should actively manage patterns of growth*", with significant development sited "*on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes*".

3.2.4 Paragraph 108 of the NPPF also states the following:

"In assessing sites that may be allocated for development in plans, or specific applications for development, it should be ensured that:

- a) appropriate opportunities to promote sustainable transport modes can be – or have been – taken up, given the type of development and its location;
- b) *safe and suitable access to the site can be achieved for all users; and*
- c) *any significant impacts from the development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree."*

3.2.5 Crucially, paragraph 109 states that "Development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe".

3.3 Planning Practice Guidance

3.3.1 Published in 2014, the Government's Planning Practice Guidance 'Travel Plans, Transport Assessments and Statements in Decision-Taking' outlines the fundamental principles that form the basis of Travel Plans (TPs), TAs, and Transport Statements (TSs). The guidance states that producing these documents provides a means to assess, and mitigate, the negative transport impacts of development; in this way, sustainable development can be achieved.

3.3.2 The guidance sets out that whilst TPs promote the implementation of sustainable travel into the planning process, TAs and TSs assess the potential transport implications of developments and significantly whether the residual transport impacts of a proposed development are "severe".

3.4 Manual for Streets

3.4.1 "Manual for Streets", launched in March 2007, superseded "Design Bulletin 32", first published in 1977 and its company guide "Places, Streets and Movement" providing new advice for the design of residential streets in England and Wales. A second iteration "Manual for Streets 2: Wider Application of Principles" was subsequently published in October 2010. The document builds on the original philosophies and demonstrates how they can be extended to encompass the design of busier streets and non-trunk roads. It provides a flexible and pragmatic guidance to assist Local Planning and Highway Authorities in managing their urban highway network.

3.4.2 The overarching theme of MfS is to increase the quality of life through good design which creates people-orientated streets. It highlights the importance of interactions between all road users and states that:

"Streets should not be designed just to accommodate the movement of motor vehicles. It is important that designers place a high priority on meeting the needs of pedestrians, cyclists and public transport users, so that growth in these modes of travel is encouraged"

3.4.3 Manual for Streets aims to assist in the creation of zones for movement that:

- Help to build and strengthen the communities they serve;
- Meet the needs of all users, by embodying the principles of inclusive design;
- Form part of a well-connected network;
- Are attractive and have their own distinct identity;
- Are cost-effective to construct and maintain; and
- Are safe.

3.5 Manual for Gloucestershire Streets

3.5.1 Manual for Gloucestershire Streets (MfGS) published in July 2020 expands on the guidance within MfS and MfS2 and further tailors these principles to the specific character of the street network of Gloucestershire. The aims of the document are set out in page 5 of the document which states the following in the first paragraph:

"Manual for Gloucestershire Streets (MfGS) provides guidance to developers, their consultants and design engineers, Local Planning Authorities, Parish and Town Councils, and the public on how new development

within Gloucestershire can contribute towards the provision of a safe and sustainable transport network within the County.”

3.6 Gloucestershire's Local Transport Plan– 2015-41

3.6.1 The Gloucestershire Local Transport Plan (LTP) sets out the long-term transport strategy for implementation within the county. The vision for Gloucestershire is for:

‘A resilient transport network that enables sustainable economic growth by providing travel choices for all, making Gloucestershire a better place to live, work and visit’

3.7 Stroud District Council's Local Plan

3.7.1 SDC adopted their Local Plan in November 2015, providing the planning policy framework for the District for the period up to 2031. The Local Plan sets out a Development Strategy to provide an overview of the District and how it should evolve during the plan period. The plan includes six strategic objectives, one of which is related to transport:

Strategic Objective SO4: Transport and Travel

“Promoting healthier alternatives to the use of the private car and seeking to reduce CO2 emissions by using new technologies, active travel and / or smarter choices, working towards a more integrated transport system to improve access to local goods and services”.

3.7.2 The Local Plan proceeds to outline policies set to achieve their objectives. Those policies pertinent to this proposal are outlined below.

Core Policy CP3 – A hierarchy for growth and development across the District’s settlements

3.7.3 This policy identifies Cam and Dusley as one of the first tier settlement areas and makes the following statement in relation to these first tier locations:

“These are the District’s main towns. They are the primary focus for growth and development to safeguard and enhance their strategic roles as employment and service centres. They will continue to provide significant levels of jobs and homes, together with supporting community facilities and infrastructure to meet their economic potential in the most sustainable way.”

Core Policy CP13 – Demand Management and Sustainable Travel Measures

“In all development cases, schemes shall:

- *Be located where there are, or will be, at the time of development, choices in the mode of transport available and which minimise the distance people need to travel;*
- *Provide appropriate vehicular parking, having regard to car ownership and the Councils adopted standards;*
- *Not be detrimental to and, where possible, enhance road safety; and*
- *Not cause or contribute to significant highway problems or lead to traffic related environmental problems.*

Development proposals shall be consistent with and contribute to the implementation of the agreed transport strategy, set out in the Gloucestershire Local Transport Plan. Any transport assessment needs will be consistent with the requirements set out in the Gloucestershire Local Transport Plan.”

- 3.7.4 The information contained within this TA demonstrates that the proposed development is in accordance with the above policy.

Delivery Policy EI12 – Promoting Transport Choice and Accessibility

Delivering Transport Infrastructure

“Where appropriate, new developments will be required to connect into the surrounding infrastructure and contribute towards new or improved walking, cycling and rail facilities within the District and the provision of an integrated public transport network across the District. Developers must take account of the proposals included within Stroud Infrastructure Delivery Plan and the Gloucestershire Local Transport Plan. In appropriate circumstances, new development will be required to contribute towards these schemes. Contributions, where reasonable and viable, will be sought towards these strategic transport infrastructure schemes from major development proposals throughout the plan period. Proposals which are likely to prejudice the future development of strategic transport infrastructure will not be permitted”.

Parking Standards

“Vehicular parking standards for new development should be provided in accordance with adopted standards, as set out in Appendix 2 of the Local Plan, or where the developer can adequately justify their own parking provision with evidence accompanying any planning application. Evidence will need to demonstrate that the level would not have a detrimental impact on the local road network”.

- 3.7.5 The assessments have shown that there will be a negligible impact on the local transport network. Furthermore, as noted in **Section 5**, parking will be provided in accordance with the adopted standards.

3.8 Stroud District Local Plan Review – Pre-Submission Draft Plan (May 2021)

- 3.8.1 This document is a draft local plan which the council is in the process of reviewing, it is anticipated that this document will be adopted by the end of 2022.

- 3.8.2 It is important to note that Policy PS24 of the emerging local plan details that the site is allocated for strategic mixed-use development:

“Land west of Draycott, as identified on the policies map, is allocated for a strategic housing development, including residential and community uses. A development brief incorporating an indicative masterplan, to be approved by the District Council, will detail the way in which the land uses and infrastructure will be developed in an integrated and co-ordinated manner. This will address the following:

1. *Approximately 900 dwellings, including 30% affordable dwellings, to address tenure, type and size of dwellings needed within the Cam and Dursley cluster area;*
2. *A 2 form entry primary school (incorporating early years' provision) on a 2 hectare site and contributions towards secondary school and further education provision;*
3. *A contribution towards the extension of existing health facilities at Cam to support the development;*
4. *Accessible natural green space providing a net gain to local biodiversity and public outdoor playing space, including on-site community building or access improvements and contributions to Jubilee*

- Fields and contributions to off-site indoor sports and leisure facilities, in accordance with local standards;*
5. *Structural landscaping buffer along the northern and western boundaries incorporating existing and new native hedgerows and trees and linking with existing green infrastructure;*
 6. *On site and, if appropriate, off site work to mitigate against the identified impacts of development upon the Severn Estuary SAC/SPA/Ramsar site;*
 7. *The acceptable management and disposal of surface water, including sustainable drainage systems (SuDS);*
 8. *Adequate and timely infrastructure to tackle wastewater generated by the development, in agreement with the relevant water company;*
 9. *A layout, density and built form and character which conforms to the Cam Neighbourhood Plan Design Code;*
 10. *A layout which prioritises walking and cycling and access to public transport over the use of the private car by, for example, providing a network of internal walking and cycle routes that are shorter in distance than the highway network, in accordance with Manual for Streets;*
 11. *High quality and accessible walking and cycling routes within the site including the retention and diversion of existing footpaths as necessary, the provision of a pedestrian and cycle crossing on the A4135 for safer access to/ from Cam and Dursley station and Cam local centre and contributions towards the enhancement of off-site walking and cycling routes to key destinations including to Cam local centre, Draycott Business Park and Draycott Mills, local schools, the A38 and the Cam and Dursley Greenway;*
 12. *Contributions and support to sustainable transport measures on the A38 and A4135 sustainable transport corridors;*
 13. *A bus loop through the site and bus stops and shelters at appropriate locations within the development to access existing diverted and new bus services and contributions to enhance bus service frequencies to key destinations including Dursley, Gloucester, Stroud, and Stonehouse;*
 14. *Electric vehicle charging points in accordance with local parking standards;*
 15. *Behavioural change measures to encourage sustainable travel by way of new and improved infrastructure and implementation of a Travel Plan.*
 16. *Primary vehicular access from the A4135, with necessary improvements to the existing highway network;*
 17. *Any associated infrastructure enhancements required and identified in the Stroud Infrastructure Delivery Plan in this location;*
 18. *Phasing arrangements to ensure that community provision is made in a timely manner."*

3.8.3 **Figure 3.1** is an extract from Stroud District Local Plan Review (2019) which identifies the boundary of this allocation.

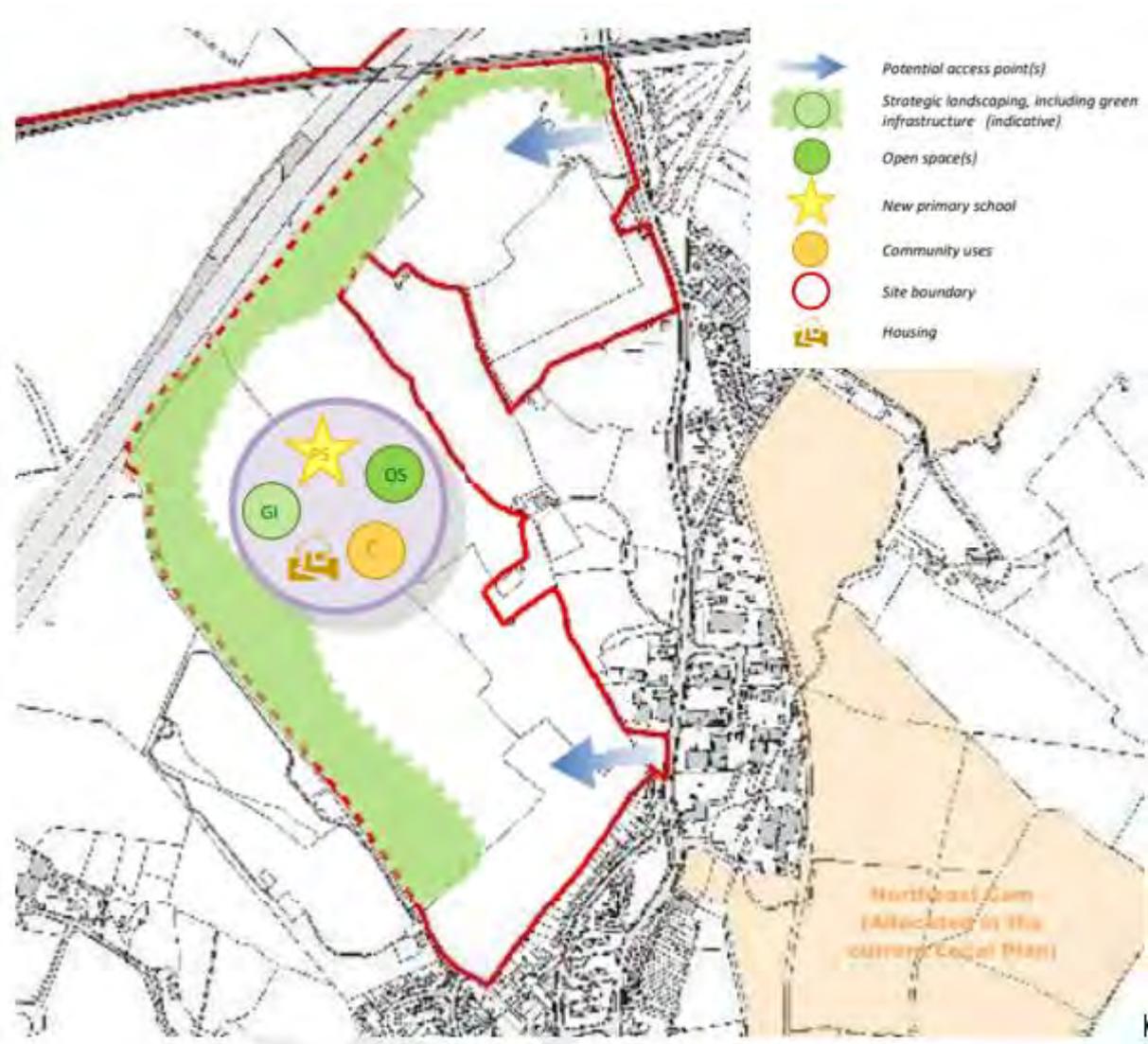


Figure 3.1 Land identified for redevelopment (Stroud District Local Plan Review Draft, 2019)

3.9 Stroud Sustainable Transport Strategy

3.9.1 This Sustainable Transport Strategy (STS) has been developed to form part of the evidence base for Stroud District Council’s Local Plan Review. It will play a key role in setting out plans for achieving the connectivity and mobility needed to support growth, in as sustainable a manner as possible.

3.9.2 The STS is to ensure that new strategic developments deliver on the Local Plan Objectives to reduce the environmental impacts of transport and to support a transformative rebalancing of the transport network in favour of sustainable forms of transport.

3.9.3 The STS has identified a number of measures and opportunities for the site which should be imbedded within the layout and design of the development to maximise the site’s accessibility and permeability by sustainable modes of travel and to ensure that enhancements are prioritised above the provision of additional highway capacity.

3.9.4 The envisaged key measures encompass:

- *"Masterplan design to give pedestrians/cyclists highest priority within the proposed development through a comprehensive network of local and strategic footpaths/cycleways that connect to existing facilities on the surrounding highway network.*
- *Active Travel Links into Draycott Business Park and Draycott Mills Contributions and support to sustainable transport measures on the A38 and A4135 sustainable transport corridors.*
- *Pedestrian and cycle crossing on the A4135 for safer access to/ from Cam and Dursley station and Cam local centre.*
- *Active Travel connections to the Cam and Dursley Greenway*
- *Existing footpaths to be retained and/or diverted as necessary.*
- *Emerging road layout to accommodate a potential bus loop through the site.*
- *Improvements to bus services, particularly those on the A4135 linking to wider destinations including Gloucester and Stroud."*

3.10 Cam Neighbourhood Development Plan (2019-2031)

3.10.1 Under the provisions of the Localism Act, the Parish Councils have the power to form a plan to help shape the location of new homes, employment and address local infrastructure needs of consideration in the planning process. As such Cam Parish Council has recently published a version for referendum of its Neighbourhood Development Plan. This version of the plan, which was published in 2020, sets out the vision for CAM as *"a place where all, including those with mobility issues, can easily move around both within the built area, and into and around the surrounding countryside."*

3.10.2 In addition, Policy CAMMC1 – 'Improving and Enhancing Connections for Cyclists and Pedestrians'; aims to promote and improve the use of sustainable modes of transport:

"Development proposals will be supported when they deliver accessible, safe and attractive infrastructure that promotes and enables walking, cycling and public transport choices for local journeys to schools, health and community facilities, neighbourhood and village centres and the surrounding countryside.

Major development proposals relating to land allocated in the Stroud Local Plan should deliver connections and extensions to the existing network of segregated routes (snickets and PROWS) where possible.

Any new or enhanced pedestrian or pedestrian/cycle route should be provided to a high standard of inclusive design and in reference to the Cam Design Code (2019)."

3.11 Summary

3.11.1 In light of the context set out above in the review of relevant national and local policies and guidance, this TA will demonstrate the suitability of the site for residential development.

3.11.2 The core theme of sustainability is a common thread throughout these policies, not least the potential of sustainable travel modes, comprising walking, cycling and public transport, to replace the use of the private car for many short, local journeys.

4 Existing Conditions

4.1 Site Location

- 4.1.1 Cam is a village and civil parish with a population of over 8,160 people, located in Gloucestershire. Cam lies approximately 20km southwest of Gloucester City Centre and 30km northeast of Bristol City centre.
- 4.1.2 Locally, the village lies some 1.5km east of the A38, which forms part of the strategic road network providing a link from Gloucester through to Bristol and access to the M5.
- 4.1.3 The site that forms the subject of this TA is located on the northern fringe of Cam, in an area called Draycott approximately 1km north of the village's centre. The location of the site is shown above in **Figure 2.1**.

4.2 Site Accessibility Audit

Introduction

- 4.2.1 This section provides a comprehensive review of the sustainability credentials of the site, encompassing a review of accessibility to existing facilities and services in Draycott, Cam, as well as opportunities for journeys to and from the site to be made by sustainable means.
- 4.2.2 The requirement to locate residential developments within walking distance of day-to-day needs is set out in the NPPF, which states that "*Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes*".

Local Facilities and Services

- 4.2.3 A range of facilities and services, which serve the daily needs of the existing population of Cam, are reachable from the site by sustainable means and as such there will by no means be a requirement to rely on the use of the private car for daily journeys.
- 4.2.4 The former Planning Policy Guidance 13: Transport (2011), identified 2km as a distance within which walking offers the greatest potential to replace short car journeys. Whilst superseded in planning terms, this guidance is still widely considered as applicable in terms of accessibility. As such, the accessibility of the site has been assessed with weight given to this distance as 'reasonable'.
- 4.2.5 **Figure 4.1** below shows a 2km walking isochrone from the site, which roughly equates to a 24-minute walk. This isochrone is measured from the centre of the site and is based on egress by way of the two key points of pedestrian access which are discussed further in **Section 5**.

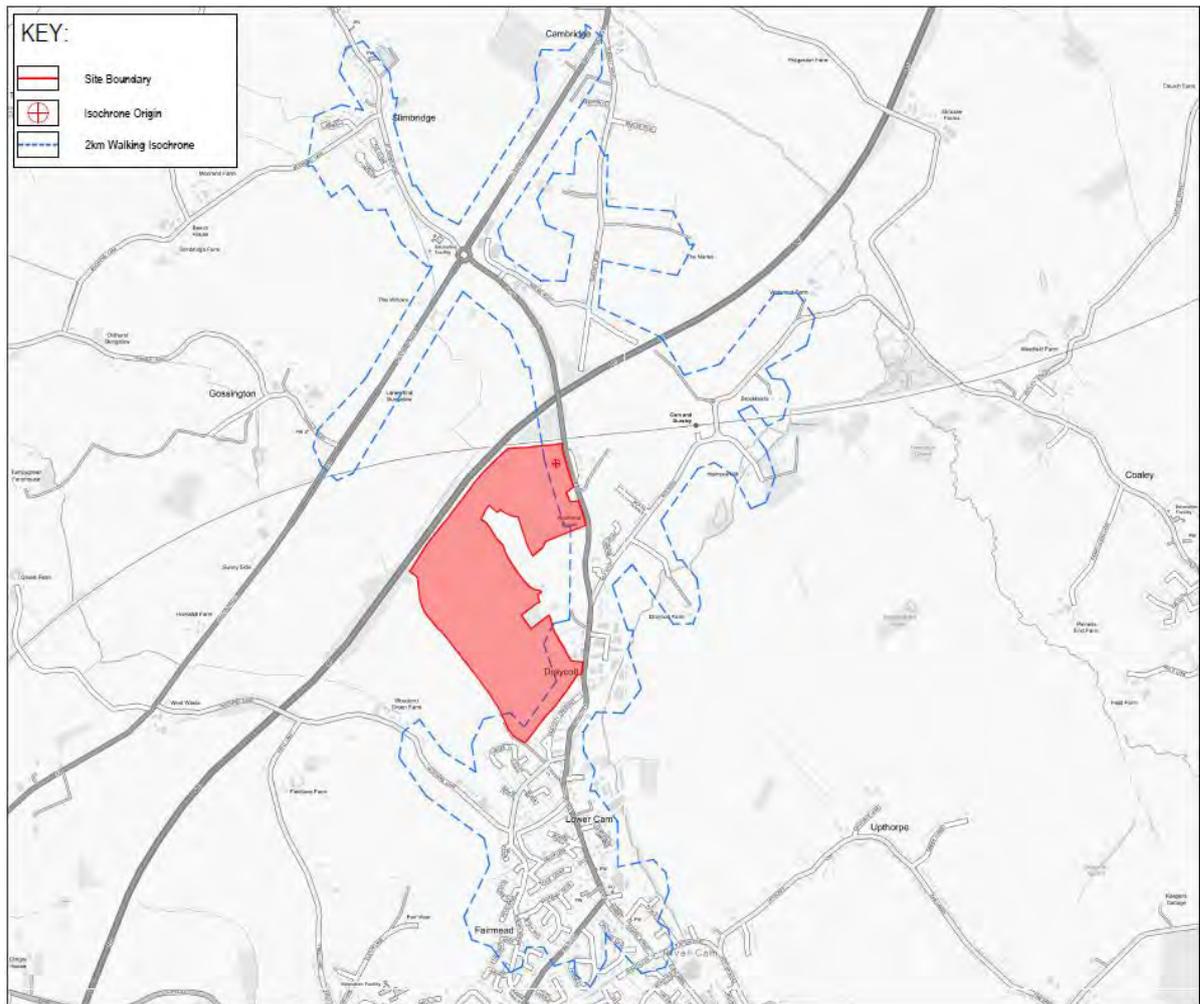


Figure 4.1 – Walking Isochrones

- 4.2.6 As shown, to the south the majority of Cam lies within an 2km walk of the site, whilst to the north lies Cam Dursley Railway Station.
- 4.2.7 To assess the opportunity for everyday journeys to and from the site to be undertaken on foot, a review of the facilities and services located within these ‘reasonable’ walking distances has been undertaken. It should be noted that this is not intended as an exhaustive summary, but more so a demonstration of the types of amenities reachable.
- 4.2.8 **Figure 4.2** below presents this review, showing an overview of the range of facilities and services that lie within a ‘reasonable’ walking distance of the site.

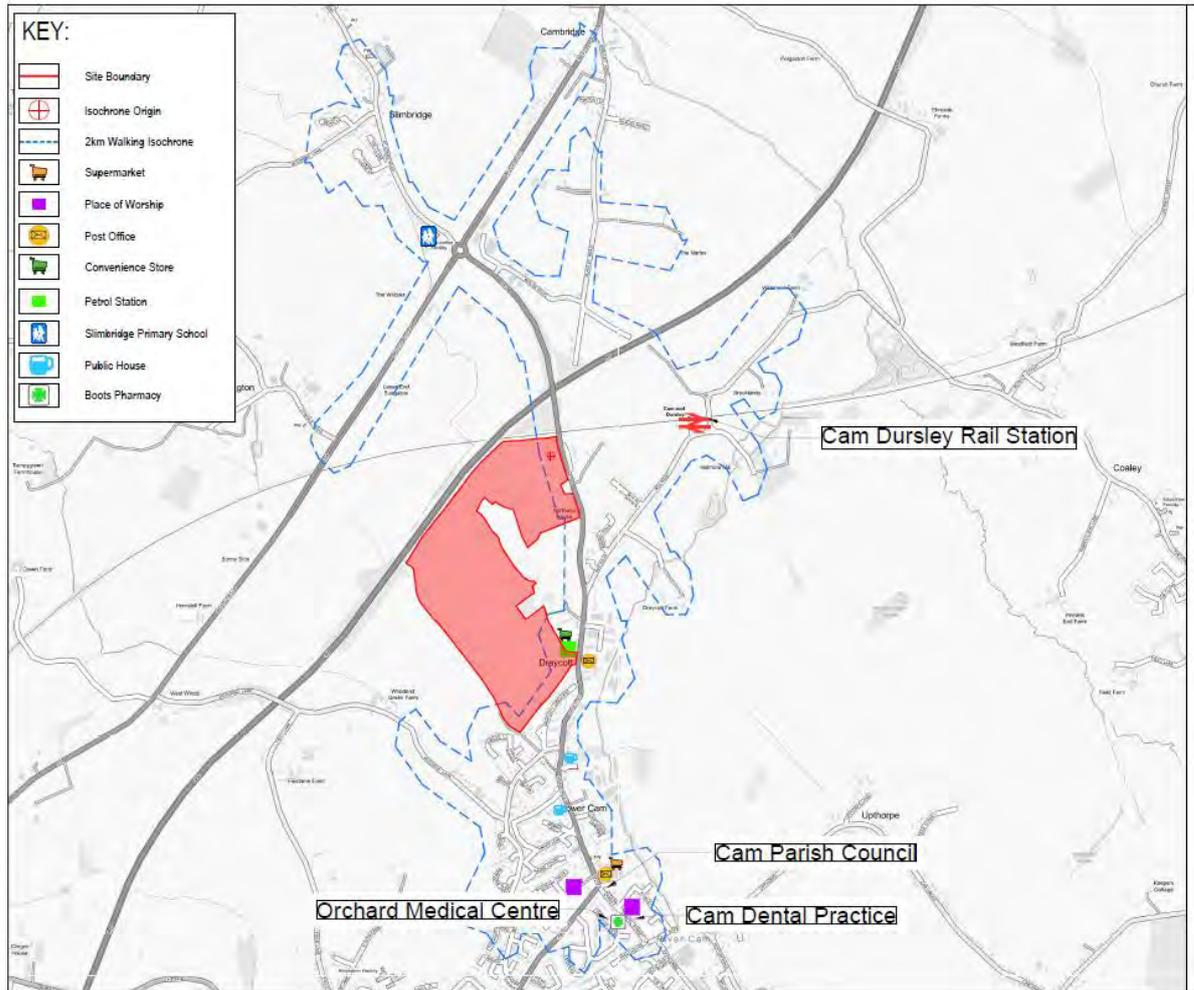


Figure 4.2 – Site Accessibility

4.2.9 As shown above, there is a convenience store which is located adjacent to the site and as such this destination lies within a 10-minute walk of its centre. Furthermore, the nearby Dracott Business Centre is also located in close proximity providing employment within 10 minutes walk of the site.

4.2.10 The distance and estimated journey times (for walking and cycling) from the site to the identified facilities and services are summarised in **Table 4.1** on the following page. These distances have been measured from the centre of the site and follow suitable routes. The estimated journey times are calculated based on a walking speed of 1.4 metres per second (abstracted from IHT, 2000) and a cycling speed of 4 metres per second.

Service/Facility	Location		Walking Distance (metres)	 (minutes)	Cycling Distance (metres)	 (minutes)
Community						
Shell	A4135 Draycott	GL11 5DH	700	8	700	8
Post Office	Noel Lee Way	GL11 5PS	1700	20	1700	7
Tesco Superstore	High St	GL11 5LE	1700	20	1700	7
Education						
Slimbridge Primary School	St John's Rd	GL2 7DB	1100	13	1100	5
Employment						

Service/Facility	Location		Walking Distance (metres)	 (minutes)	Cycling Distance (metres)	 (minutes)
Draycott Business Estate	A4135	GL11 5DQ	600	7	600	3
Place of Worship						
St Bartholomew's Church	Cam Pitch	GL11 5JX	1700	20	1700	7
Cam Methodist Church	Chapel Street	GL11 5NU	1800	21	1800	8
St John the Evangelist	Slimbridge	GL2 7BJ	1900	23	1900	8
Public House						
Berkeley Arms	High Street	GL11 5LA	1600	19	1600	7
Recreation						
Cam Football Club	Cam	GL11 5UL	1300	15	1300	5

Table 4.1 – Distance and estimated journey time to services and facilities

- 4.2.11 Importantly, a post office, supermarket, medical centre, place of worship, pharmacy, and Slimbridge Primary School are all located within a 2km walk. As such, the proposed site is well-situated in relation to a range of existing facilities and services.
- 4.2.12 Given the above assessment, it is reasonable to conclude that the site is located in a sustainable position, being well-related to the existing villages of Draycott and Cam and the range of facilities and services hosted within. These destinations lie within a 'reasonable' walking and cycling distance of the site, and as such there is a genuine opportunity for everyday journeys to and from the site to be made sustainably and without a dependence on the private car.
- 4.2.13 Given the location of the site, and the demonstrable opportunity for everyday journeys to be made on foot and by bicycle, the site presents the opportunity to create a development that is sustainable and that encourages journeys to be made actively.

Pedestrian Accessibility

- 4.2.14 Walking is the primary mode of travel for local journeys and is widely recognised as the most sustainable form of travel (IHT, 2000). As such, walking forms an important part of sustainable growth, with the NPPF guiding that opportunities to promote walking are identified and maximised.
- 4.2.15 Therefore, by locating developments to minimise the need to travel, and to maximise the use of sustainable modes of transport, sustainable growth can be encouraged.
- 4.2.16 As set out above the location of the site is conducive to the creation of a sustainable development, with a range of everyday facilities and services lying within 'reasonable' walking distance.
- 4.2.17 The site is linked to these offerings by way of the existing network of footways and footpaths that run through Cam, with this network combining to create continuous routes to facilitate journeys to and from the site on foot. Generally, this network provides streetlights, footways/footpaths of a reasonable quality and pedestrian crossing facilities.
- 4.2.18 The primary pedestrian link from the wider network to the site will be via the A4135 Draycott. The single carriageway affords the core pedestrian route between the village Cam in the south and Slimbridge to the north.

- 4.2.19 A kerbed footpath of variable width runs continuously along the eastern side of the single carriageway facilitating continuous pedestrian links to the adjoining employment and residential premises along the route. Whereas, to the immediate south of the southern access point, a street lit roadside pavement becomes available on the western side of the single carriageway.
- 4.2.20 From here, a well-lit and paved footway continuously runs along either side of the single carriageway that extends southwards along the alignment of the A road through the village centre of Lower Cam at where majority of the day to day facilities and amenities can be accessed.
- 4.2.21 Along the alignment of the A4135, the roadside footway knits together the pedestrian provisions along the side roads either side of the single carriageway facilitating onwards pedestrian accesses to the local settlements, primary education, health, retail and employment destinations.
- 4.2.22 Running northwards, the walking route traverses the railway line and M5 facilitating onwards pedestrian connections into the village of Slimbridge. Some 450 metres south of the northern site access, the roadside provision extends onto Box Road facilitating onwards pedestrian links to Cam and Dursley Railway Station.
- 4.2.23 The existing local pedestrian provision is illustrated in **Figure 4.3**.

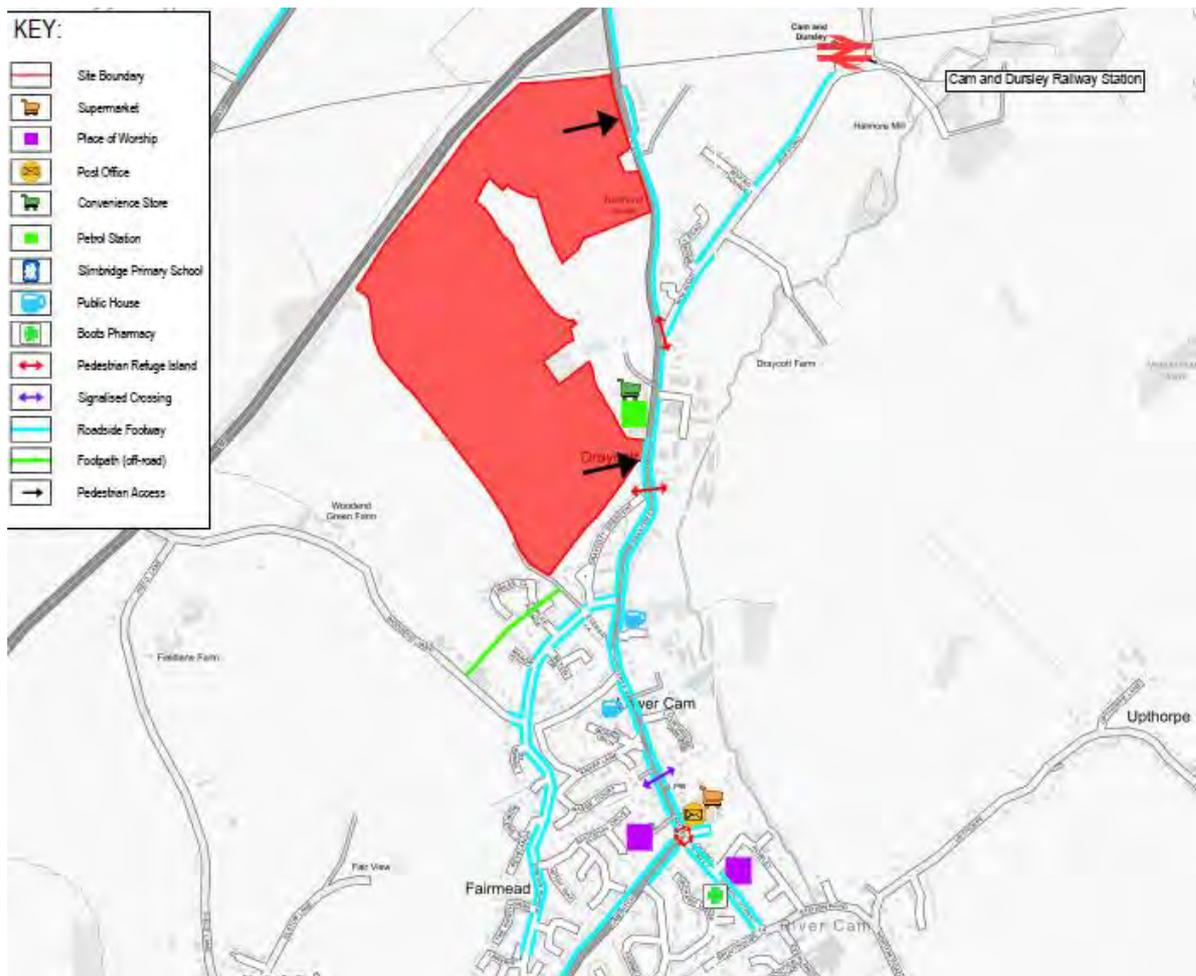


Figure 4.3 – Existing Pedestrian Infrastructures

4.2.24 It is noted that the lands off Box Road are subject to a series of consented residential developments through which a network of highly permeable walking and cycling routes will be created in a combination of traffic free routes, roadside provision and shared-use paths. Offsite highway proposals to improve the pedestrian connections in the local areas are secured through planning obligations for these committed developments including:

- Upgrade of the existing footway along the northern side of Box Road
- Introduction of a new footway to the southern side of Box Road; and
- Proposals to provide a footpath/cycleway along the route of the disused railway linking Box Road to Draycott Mills which will form part of the wider aspiration in creating the Cam, Dursley and Uley Greenway.

Public Rights of Way

4.2.25 There is a network of PRow that permeate through the area surrounding the site, **Figure 4.4** below shows the public footpaths within the area of the site.

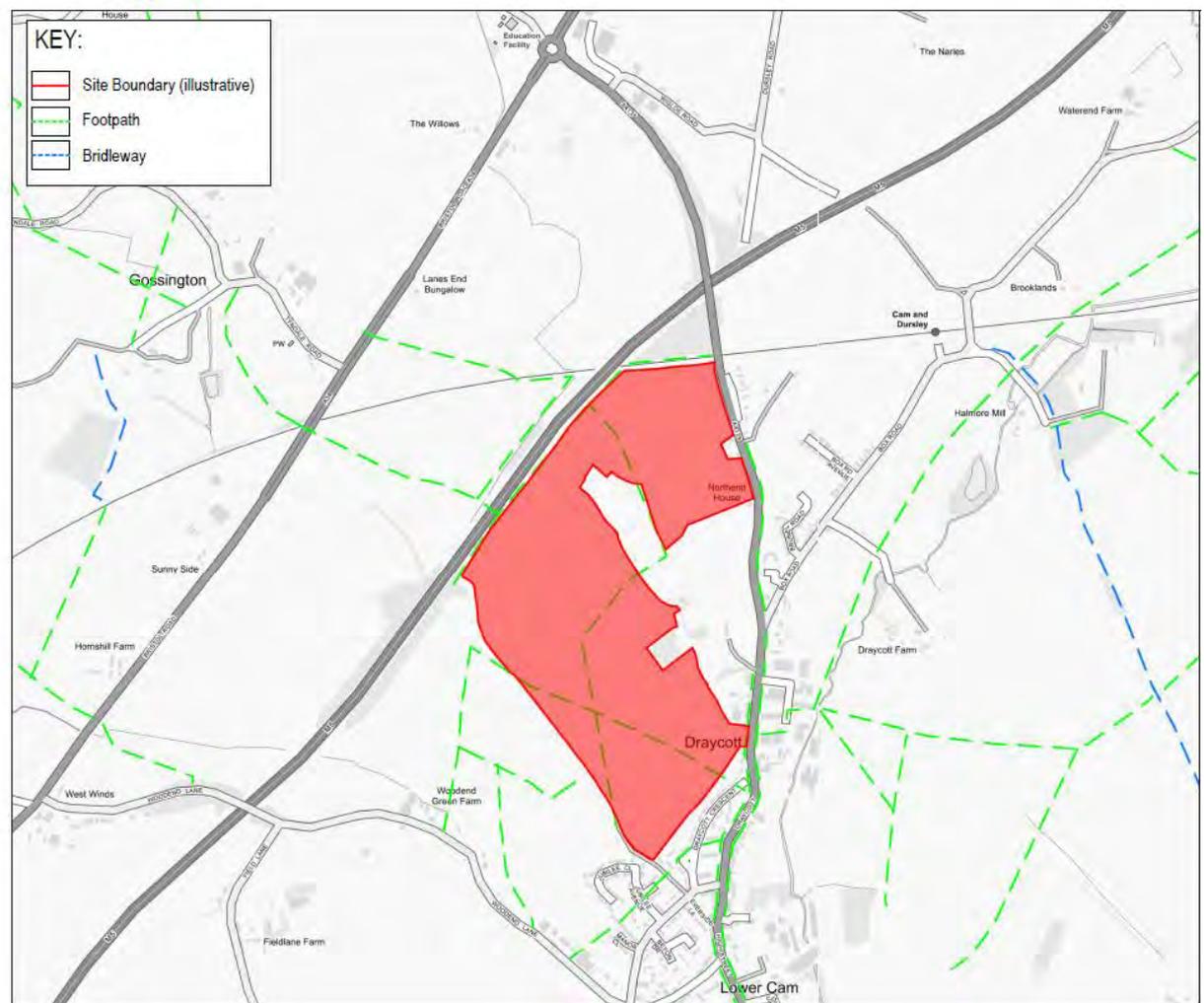


Figure 4.4 – Public Rights of Way

4.2.26 As shown, there is a series of PRow comprising footpaths and bridleways in Cam. Furthermore, there are a number of PRow that traverse the site providing leisure routes and additional points of connection.

Summary

4.2.27 As set out above, the existing network of footways and PRow within Cam provide continuous connections between the site and important destinations in the village.

Cyclist Accessibility

4.2.28 Cycling is recognised as one of the most sustainable forms of transport (CIHT's Planning for Cycling, 2015). In general, given the compact nature of Cam, it is considered that cycling offers a real alternative to the private car for day-to-day journeys to and from the site. Indeed, the entirety of Draycott, Cam, Cambridge and Dursley lie within a 5km cycle of the site, with this distance widely-recognised as a reasonable cycling distance. As such, the facilities, services and employment opportunities within these villages lie within a reasonable cycling distance of the site.

4.2.29 It is also noted that Rednock School Secondary School is located some 3.8km to the south of the site and therefore can be reached within a 'reasonable' cycling distance of the site. As such, there is the opportunity for day-to-day journeys to this destination to be made sustainably.

4.2.30 **Figure 4.5** below demonstrates the area surrounding the site which lies within a 5km cycle.



Figure 4.5 – Cycling Isochrone

Public Transport Accessibility

Bus

- 4.2.31 The site is located in close proximity to the routes of the existing bus services that pass through Draycott and Cam, and as a result there is an opportunity to encourage the use of the existing bus services for day-to-day journeys to and from the site.
- 4.2.32 The closest bus stops to the site are located along A4135 and are referred to as 'Coaley Junction', 'Draycott Business Park' and 'Draycott Crescent'. These bus stops are situated in close proximity to the proposed points of access and therefore are conveniently located for residents of the Development. Bus stops running along the A4135 (i.e. that stop at one or more of these stops) encompass service 60 (Between Cam and Dursley), service 61 (running between Bussage, Stroud, Stonehouse and Dursley), and service 65 (running between Draycott, Dusley, Uley, Nympsfield, and Stroud).
- 4.2.33 In addition, there is also a bus stop along Manor Avenue referred to as 'Everside Lane' which is also accessible within a reasonable walking distance (i.e. 1km / 12 minute walk from the centre of the Site). This bus stop is served by the 62 service running between Dursley, Sharpness, Berkeley, Falfield and Bristol.
- 4.2.34 A summary of the services stopping at these bus stops is provided in **Table 4.2**. This table presents the service, bus stop, route, approximate frequency and operating hours of these services. In addition, **Figure 4.6** below illustrates the routes of these services in the vicinity of the site. Full details of bus timetables have also been included as **Appendix C** of this TA.

Service	Bus Stop	Route	Weekday	Saturday	Sunday
60	Coaley Junction, Draycott Business Park, and Draycott Crescent	Gloucester - Dursley	120 mins	120 mins	120 mins
61	Coaley Junction, Draycott Business Park, and Draycott Crescent	Bussage - Stoud - Stonehouse - Dursley	60 mins	60 mins	No Service
62	Everside Lane	Dursley - Cam - Sharpness - Berkeley - Falfield - Bristol	120 mins	120 mins	No Service
65	Draycott Business Park and Draycott Crescent	Stroud -Cam & Dursley	150 mins	No Service	No Service
X1A	Coaley Junction	Rednock School	Tidal School Service	No Service	No Service
X3	Draycott Business Park	Rednock School	Tidal School Service	No Service	No Service

Service	Bus Stop	Route	Weekday	Saturday	Sunday
	and Draycott Crescent				
X11	Draycott Business Park and Draycott Crescent	Katharine Lady Berkeley School	Tidal School Service	No Service	No Service
346	Draycott Business Park and Draycott Crescent	Rednock School	Tidal School Service	No Service	No Service

Table 4.2 – Summary of Bus Services Passing in Close Proximity to the Site

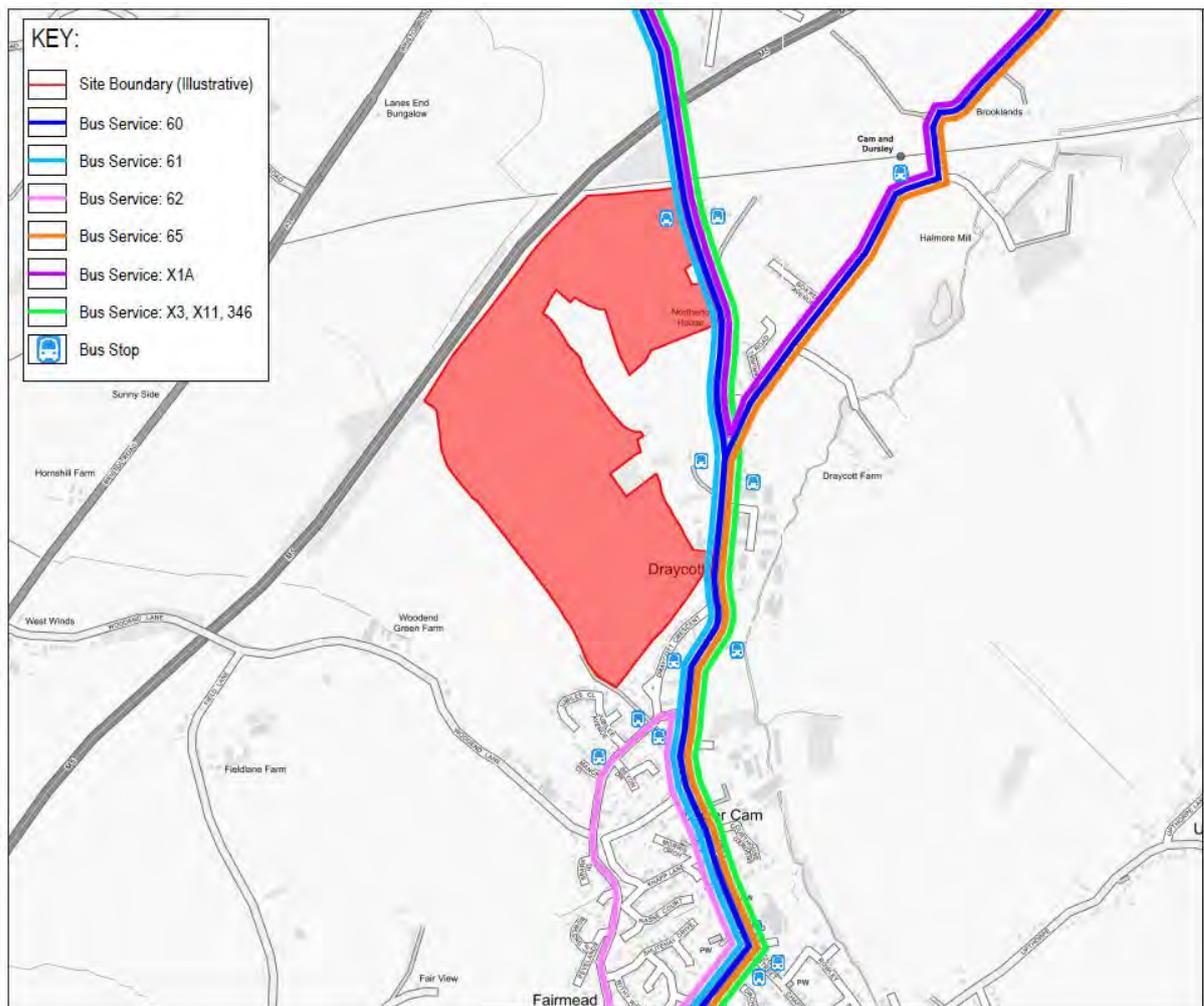


Figure 4.6: Bus Services

4.2.35 In combination the bus services stopping in close proximity to the site provide a combined frequency equating to 2-3 buses an hour (i.e. 1 bus every 20-30 minutes). It should also be noted that there is dedicated school services that provide connections to the nearest secondary schools that also connect with one or more of the aforementioned bus stops on A4135 Draycott that consist of the X1A, X3, X11, and 346 services providing connections with Rednock School (X1A, X3, and 346) and Katharine Lady Berkeley's School (X11).

4.2.36 The approximate journey times, from the bus stops close to the site, to a selection of destinations are summarised below:

- **Cam & Dursley Railway** – From Coaley Junction – via 60 service 2 minutes;
- **Lower Cam** – From Coaley Junction – via 61 service – 3 minutes;
- **Rednock School** – From Coaley Junction – via 346 – 6 minutes;
- **Dursley** – From Coaley Junction - via 61 service – 12 minutes;
- **Stonehouse**- From Coaley Junction - via 61 service – 17 minutes;
- **Berkley** – From Everside Lane – via 62 service – 28 minutes;
- **Stroud** – From Coaley Junction – via 61 service – 37 minutes;
- **Gloucester** – From Coaley Junction - via 60 service – 38 minutes;
- **Katharine Lady Berkeley's School** – From Coaley Junction – via X11 – 43 minutes; and
- **Bussage** – From Coaley Junction – via 61 Service – 74 minutes.

4.2.37 It is evident from the above review that bus services that pass through Draycott in the vicinity of the site provide regular connections to the towns in the surrounding area and also provide a link to Cam and Dursley Railway station for onward connection. As such, it is considered that the site is well-positioned to tie into the existing bus network of Draycott, which provides regular connections towards Cam, Dursley and Gloucester and as such creates the opportunity for journeys to and from these destinations to be undertaken sustainably.

Rail

4.2.38 The site is well situated in relation to Cam & Dursley Railway Station, which lies broadly 1.5km (approximately 18 minutes) walk from the centre of the Site to the east. Furthermore, convenient connections to this station can be obtained via the aforementioned 60 and 65 bus service.

4.2.39 Cam & Dursley Railway Station is operated by Great Western Railway and is served by a range of services. **Table 4.3** below sets out a summary of these services, including key destinations, approximate journey times and approximate frequencies on a typical weekday.

Destination	Approximate Journey Time	Approximate Frequency
Bristol Temple Meads	35 minutes	Every 60 minutes
Gloucester	20 minutes	Every 60 minutes
Bath Spa	65 minutes	Every 60 minutes
Cheltenham Spa	35 minutes	Every 120 minutes

Table 4.3 – Summary of Train Services from Cam & Dursley Railway Station

4.2.40 As such, it is considered that the services that call at Cam & Dursley Railway Station provide the opportunity for travel by sustainable means to a number of destinations. Cam & Dursley Station is accessible from the site by sustainable modes, creating the opportunity for multi-modal travel and representing an alternative to the private car. **Figure 4.7** on the next page shows the location of the railway station in relation to the site.

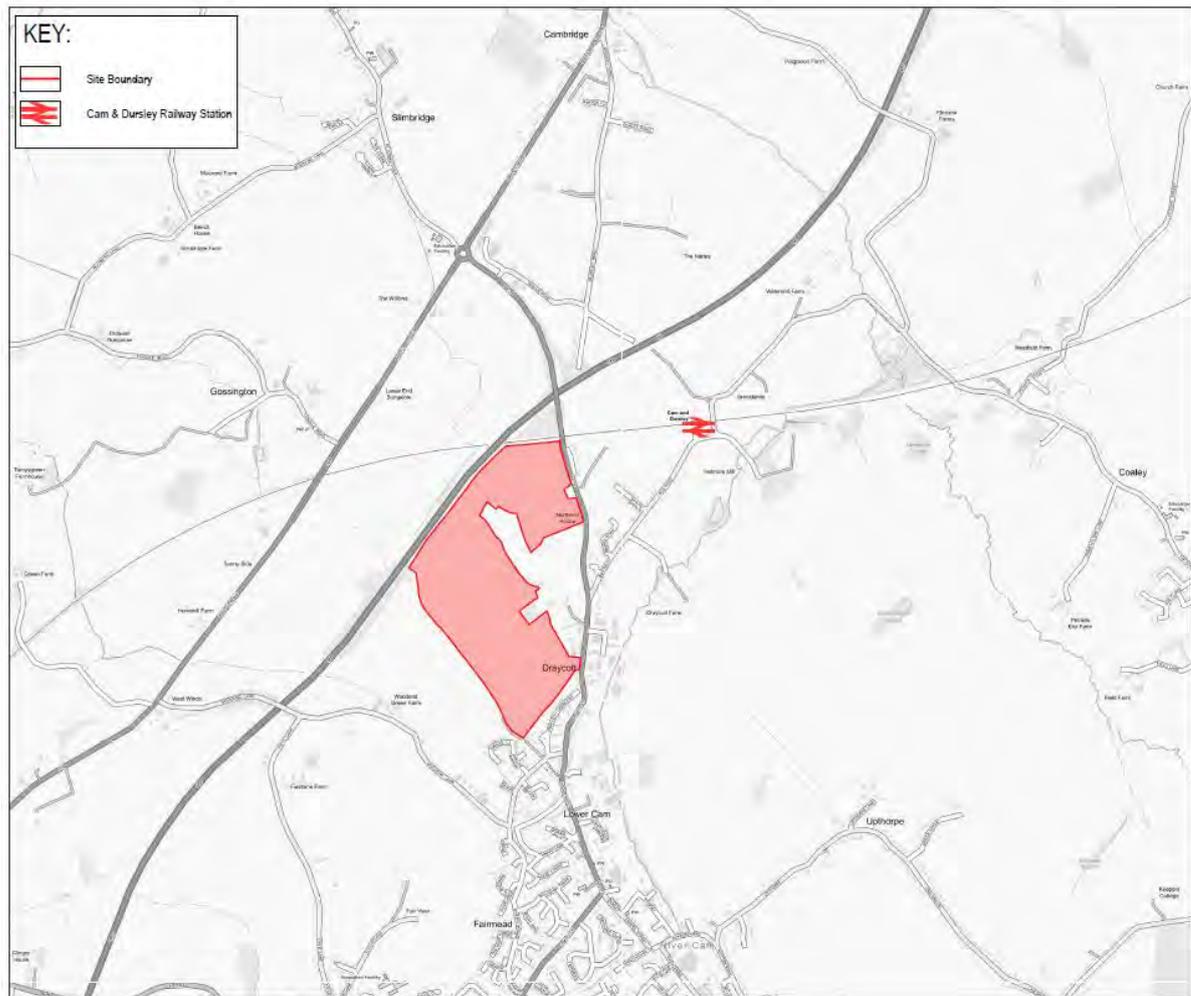


Figure 4.7 – Location of Cam & Dursley Railway Station

4.3 Travel by Car

- 4.3.1 As discussed above the site is located to the west of the A4135 which will provide the main point of access to the proposals. The A4135 provides the key link from the development to the centre of Cam approximately 900m south of the southernmost boundary of the site and the A38 approximately 800m north of the northernmost boundary of the site. In addition, to the south the A4135 also provides connection to Dursley (4km from the Site), Woodmancote (4.5km from the Site) and numerous other villages before terminating at Tetbury (20km from the Site).
- 4.3.2 In the vicinity of the site the A4135 Draycott is a single carriageway road with a single lane running in either direction. The Road is subject to a 50mph speed designation at the northern boundary of the site up until approximately 150m from the junction with Box Road where, to the south, the road becomes 40mph on the approach to Dursley and passing the southern boundary of the site.
- 4.3.3 Access to the M5 is achievable via the A38 which provides links to Junction 13 via the A419 for routes to the north and Junction 14 via the B4509 for routes to the south.

4.4 Highway Safety

- 4.4.1 To assess the safety level of the nearby highway network and thus identify any potential conflict point and highway safety issue, a review of the latest available 5-year personal injury records between 2015 and 2019 was undertaken along the road network within the vicinity of the development site and through the village of Cam using Crashmap – www.crashmap.co.uk.
- 4.4.2 A total of 11 collisions are reported including one fatality, three serious and 7 slight incidents. This equates to, on average, 2 collisions per year and therefore does not illustrate a significant pattern in this area, given the dispersed location of these collisions in relation to one another. The locations of the recorded incidents are illustrated in **Figure 4.8** below.

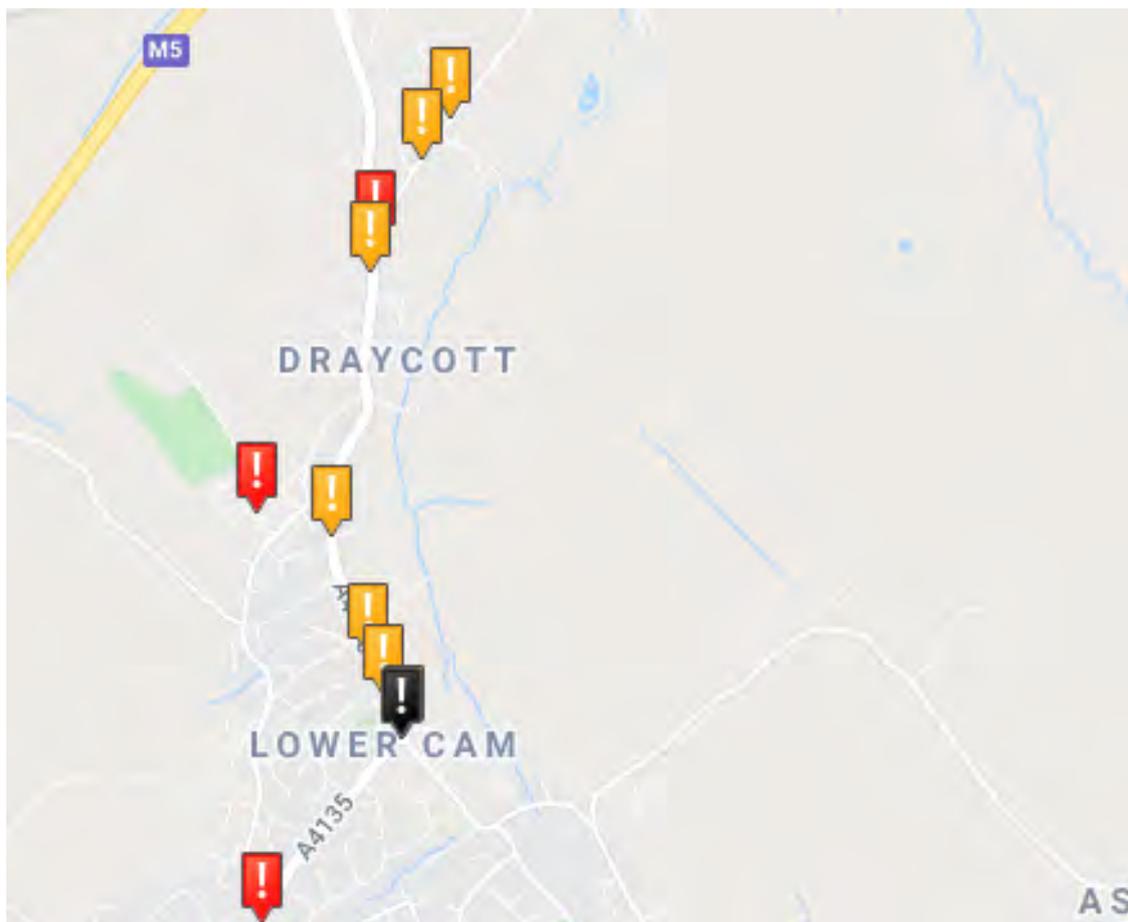


Figure 4.8 – Location and Severity of the Reported Incidents

- 4.4.3 In view of this, it is reasonable to conclude that the highway network surrounding the proposed development site does not include any geometric features that can be specifically linked to recorded collisions.
- 4.4.4 In addition, as set out in **Section 8** below, the forecast development traffic will not lead to any material changes in highway operation with mitigation measures proposed to offset any potential development traffic impact. It is therefore considered reasonable to conclude that the proposed development will not lead to any unacceptable impact on the existing road safety level.

4.5 Summary

- 4.5.1 As set out above, the proposed development is well-positioned in relation to neighbouring urban areas. Furthermore, the area is also well connected by existing walking, cycling and public transport infrastructure. Therefore, the site is considered to be situated in a sustainable location that would offer the future residents realistic and practical opportunities to travel sustainably and thus be less reliant on the private car.

5 Development Proposals

5.1 Introduction

5.1.1 This section of the TA presents the proposals for the development of the site, the strategy for providing both vehicular and non-vehicular access, and the standards for calculating the level of parking that the development would require.

5.2 Development Proposals

5.2.1 The site is irregular in shape and occupies an open field that lies to the west of the A4135 and south of the M5. The site also abuts a large area of farmland to the west and existing residential communities to the south.

5.2.2 As discussed at paragraph 2.1.2, two development options are considered as follows:

- *Option 1 – 1,030 residential units (if the land for a school is not required)*
- *Option 2 – 950 residential units and a 1.5 form entry school*

5.2.3 Details of the illustrative masterplan showing the development proposal's layout is provided as **Figure 5.1** below, with the full version also included as **Appendix A**.



Figure 5.1 – Illustrative Masterplan (extract from Appendix A)

5.3 Vehicular Accesses

5.3.1 Vehicle access to the site will be taken from two principle locations on the A4135 Draycott creating an internal through road. The details of these points of access are discussed further below:

- *Northern Access – The proposed northern access will be located at a point 240m south of the M5 overbridge and will be achieved by way of a new 3 arm 28m ICD roundabout. To reflect the change in character of the street as a result of the development proposals, it is proposed to extend the existing 40mph limit currently 150m north of Box Road to just north of the M5 overbridge.*

The design of the roundabout has been purposely engineered to incorporate appropriate geometry and visibility in accordance with the proposed speed limit of the A4135 at the access point (i.e. 40mph) and in consideration of the character of vehicle users. The drawing included **Appendix D** demonstrates the design parameters of the proposed roundabout access arrangement.

- *Southern Access – The proposed access will be located at a point approximately 40m south of the existing Shell Petrol Station on the A4135 Draycott by means of a signal-controlled T-junction.*

The access has been designed to include appropriate geometry and visibility in accordance with the speed limit of the road in the location of the access (i.e. 40mph) and in consideration of the character of vehicle users. The drawing included as **Appendix D** demonstrates the design parameters of the proposed signalised junction access arrangement.

5.3.2 Swept path analyses (**Appendix E**) have been undertaken at both the proposed roundabout and signalised junction for the largest vehicle that would require access via these junctions (i.e. bus movements). The swept path drawings demonstrate that the proposed access junctions are of sufficient geometric arrangement to accommodate the movements associated with these vehicles.

5.4 Pedestrian and Cyclist Access

5.4.1 A number of points of access for pedestrians are proposed to create a development that is permeable on foot, as shown on the next page in **Figure 5.2**.

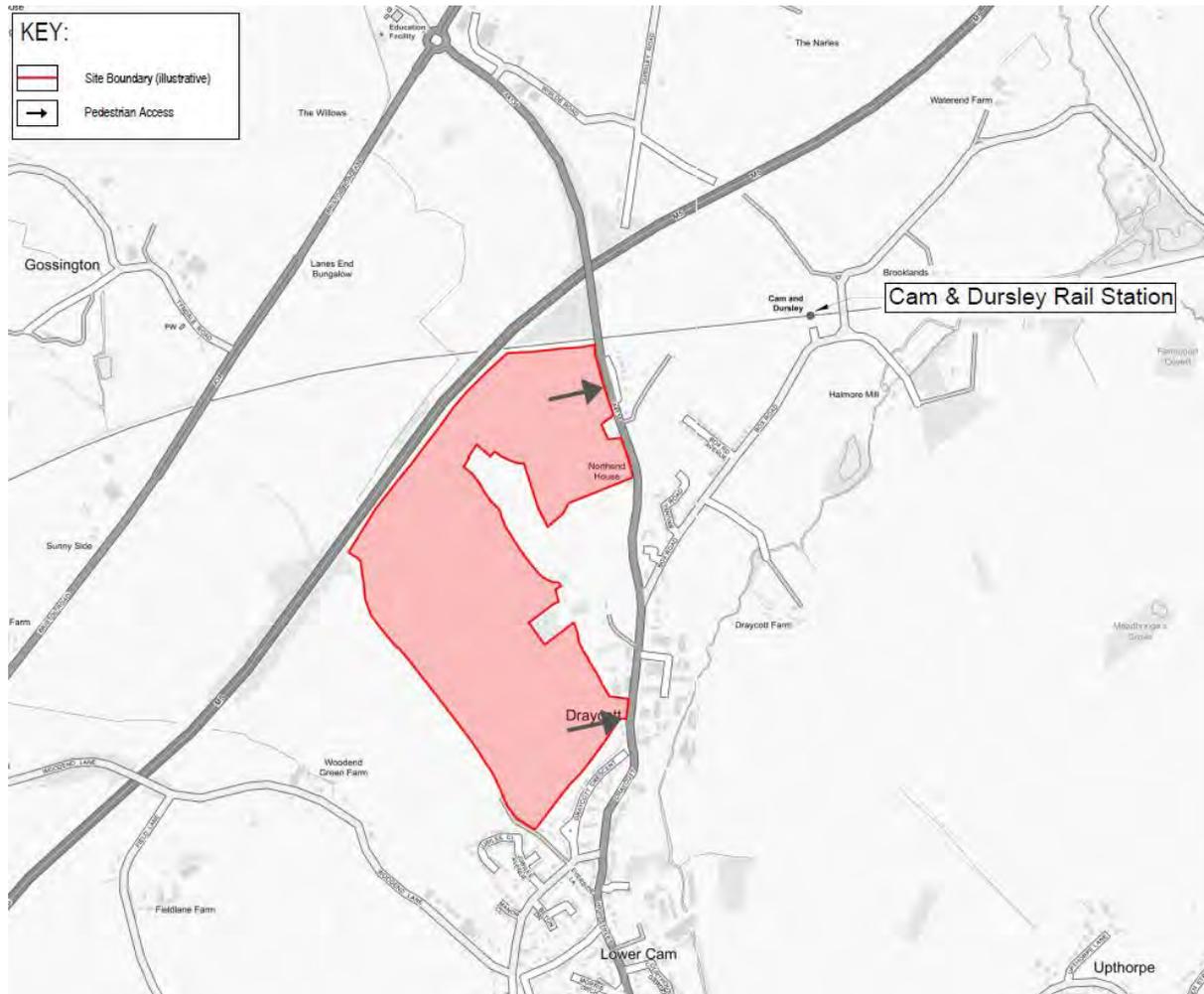


Figure 5.2 – Pedestrian Access Strategy (Illustrative)

5.4.2 Pedestrian and cycle links will be provided from both vehicle access points. These routes will tie into the existing provisions along the A4135 facilitating onwards connection into the local communities at Cam. These provisions encompass:

- *Northern Access – A connecting pedestrian / cycle route will be provided on the northern and southern side of the access at this location. Appropriate crossing facilities will also be provided across all arms of the proposed access roundabout.*

In addition, it is also proposed that a new footway will be provided on the eastern side of A4135 Draycott linking the development with routes to the north and a shared pedestrian / cycle route to the south linking the development with CAM bound routes and existing pedestrian / cycle infrastructure to the south.

- *Southern Access – A shared pedestrian / cycle route will be provided on the northern side of the southern site access which will also be extended out onto the A4135 across the frontage of the nearby Shell Petrol Station.*

In addition, a further footway connection will also be provided to the south of the proposed access. This footway will link in with the existing pedestrian infrastructure on the western side of A4135 Draycott.

Signalised pedestrian crossing facilities are also proposed across the access approach and southern arm which will further enhance pedestrian accessibility. A signal-controlled crossing facility will then be provided just north of the filling station to connect with the existing pedestrian infrastructure on the eastern side of the road.

- 5.4.3 In addition to the above, it is also proposed that connections also be provided to the existing bridleway on Everside Lane to provide an additional point of access for pedestrians and cyclists.
- 5.4.4 The proposed Access and Movements Strategy is illustrated in **Appendix A**.

5.5 Internal Road Layout

- 5.5.1 The internal road network is to be designed in accordance the standards specified in the MfGS's Guidance with particular emphasis on the creation of attractive and safe travel environment for pedestrian and cyclists through appropriate facilities to accommodate these users and the inclusion of features to slow traffic speeds.
- 5.5.2 The road speed within the site will be set at 20mph in accordance with the requirements of a residential street and will provide a safe network for pedestrian and cyclist movements. In addition, the hierarchy of internal road will be designed to reflect the volume and type of trips likely on each link and the number of properties accessed.
- 5.5.3 The central spine road will operate as a "through" link connecting between the northern and southern site access junctions off the A4135 and will be constructed to achieve the design standards set out for "Enhanced Street" in MfGS offering sufficient road space to enable its future use as a bus route. This primary vehicular route would comprise a 6.2m carriageway with a 3.5m shared pedestrian / cycle route to either side of the carriageway. Bus stop facilities will also be provided on this road to allow connections from the key bus corridor on A4135 Draycott. It is noted that the spine road will be delivered by Persimmon Homes and Robert Hitchins respectively in relation to their land-ownership.
- 5.5.4 Residential roads served via the primary route will also be designed to MfGS standards and will therefore include features and geometries to slow vehicle speeds and subsequently ensure an environment that facilitates a high volume of journeys to be undertaken via active modes (i.e. on foot or by bicycle).

5.6 Parking and Cycle Parking Provision

- 5.6.1 The scale of parking provision is viewed in some quarters as a tool in managing demand generated by vehicles, and subsequently is keenly managed by planning authorities.
- 5.6.2 The proposed framework for on-site parking provision for vehicles will be determined at the reserved matters stage having regard to the context of parking standards set out in MfGS. The relevant parking standards are outlined as follows:

- *1 bedroom dwelling – 1 space*
- *2 bedroom dwellings – 2 spaces*
- *3 bedroom dwellings – 2 spaces*
- *4 bedroom dwellings – 3 spaces*
- *5 bedroom dwellings – 3 spaces*

- 5.6.3 As set out in the MfGS guidance garages are excluded from the car parking calculations due to the ability to convert them into habitable accommodation without the need for permission and their usage for personal storage rather than that of a vehicle.
- 5.6.4 In addition, sheltered, secure and easily accessible cycle parking will be provided. A minimum of 1 space will be provided for 1 bedroom units and 2 spaces thereafter in accordance with MfGS standards. This cycle parking will be provided in the form of secure and sheltered cycle stores at the ground floor level and other space within the residential area designed to accommodate bicycles.
- 5.6.5 It is also proposed that parking for Jubilee Playing Fields can be provided within the site which can be accessed from one of the proposed residential streets to the south (i.e. rather than Everside Lane).

5.7 Travel Plan

- 5.7.1 To deliver a sustainable development, the masterplan for the proposed development has been sensitively designed to provide a high-quality layout and environment maximising transport sustainability and integration. A Framework Travel Plan has also been prepared for the proposed residential development in line with Planning Practice Guidance to:
- Raise people's awareness of sustainable travel;
 - Reduce people's dependency on car usage;
 - Discourage unnecessary car journeys; and
 - Encourage mode shift towards walking, cycling and public transport.

6 Baseline Traffic Condition

6.1 Study Highway Network

6.1.1 In order to fully understand the constraints as well as opportunities along the existing highway and thus assess the associated development traffic implications, a study network has been proposed as part of the scoping submission (**Appendix A**) encompassing the following junctions:

- Site Access junctions;
- The A38 Bristol Road/A4135/St Johns Road roundabout junction;
- The A38 / B4066 Berkeley Road priority junction;
- Taits Hill Road / Dursley Road / The Avenue priority junction;
- Woodfield Road / Tilsdown / A4135 Cam pitch mini-roundabout;
- A4135 Bull Pitch / B4066 / Woodmancote roundabout;
- Cam Pitch / A4135 High Street / Chapel Street / Noel Lee Way mini-roundabout junction;
- A4135 / Box Road / Draycott priority junction; and
- Tilsdown / Dursley / Kingshill Road mini-roundabout.

6.1.2 The extent of the highway network considered in this TA is shown in **Figure 6.1** below. This is consistent with the study area adopted for the Bathurst Ltd development.

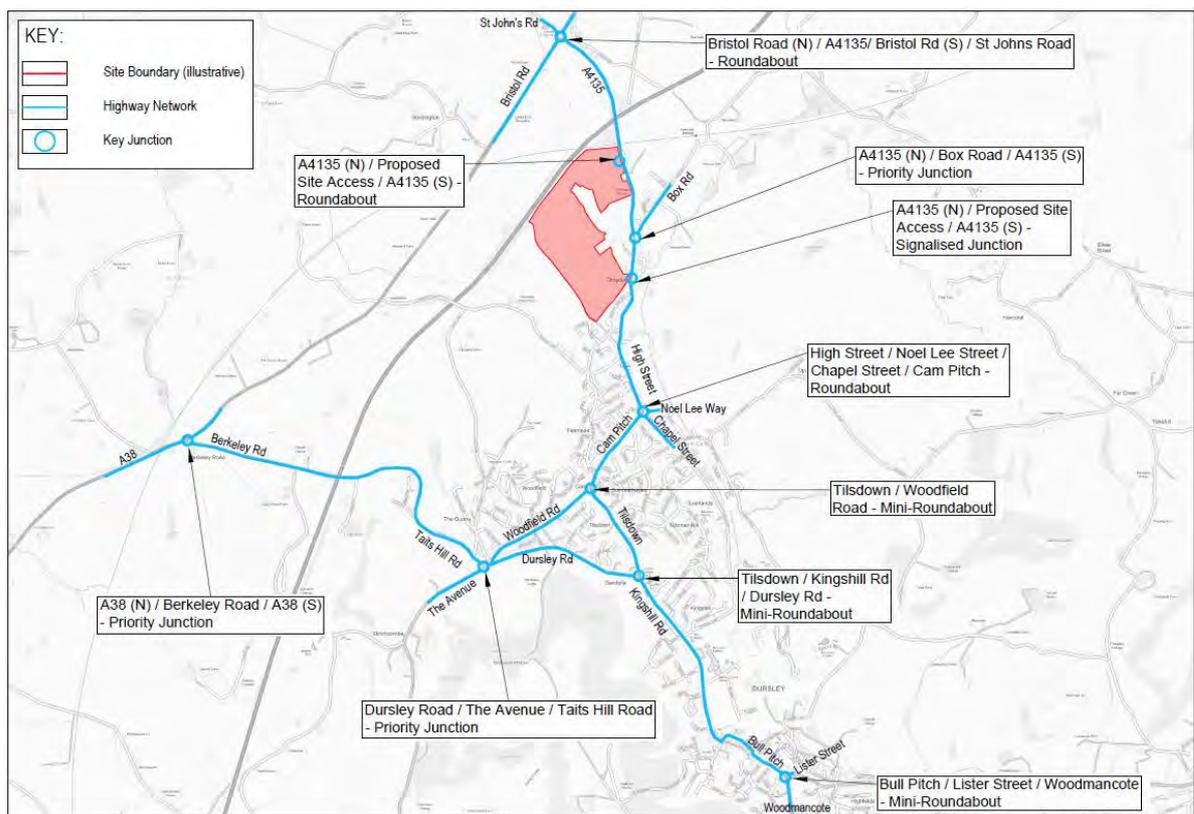


Figure 6.1 Proposed Study Highway Network

6.2 Observed Baseline Traffic

- 6.2.1 To establish a baseline traffic condition, the observed AM and PM Peak vehicle turning movements are extracted from the supporting TA for the consented Bathurst Ltd development as shown in Figure 3.3 titled "2015 Baseline (surveyed) flows". These flows, which are based on surveys understood to have been carried out on Thursday 21st May 2015, are included as **Appendix F** of the report.
- 6.2.2 To understand the fluctuation in traffic volume through the local area, a review of the Department for Transport Traffic Database has been carried out with detailed analysis and information presented as part of the scoping submission included within **Appendix B**. Two-way traffic movements that are recorded from the most complete and up to date count point (Site Reference: 947129) are obtained at the B4060 The Avenue road just south of Stinchcombe Village Hall on part of the assessed network considered within the Bathurst TA. It is evident that there is no recorded recent uplift in traffic flow in the local area since the counts were undertaken as supporting information for the Bathurst TA and therefore the obtained 2015 AM and PM Peak turning movements are considered robust. Thus, it is therefore a robust assumption that the 2015 counts as used within the Bathurst TA provide an appropriate representation of current traffic levels.

6.3 Committed Development Traffic

- 6.3.1 Best practice on Transport Assessment indicates that concurrent planning applications in the surrounding area which will have an impact on the proposed study network should be considered as part of the transport appraisal.
- 6.3.2 In the future year baseline scenarios, vehicle trip generation associated with a number of neighboring committed developments in the local area which are likely to affect the proposed study network are considered as part of the assessment. These encompass:
- S.18/2697/OUT
 - S.17/1366/OUT
 - S.17/0964/OUT
 - S.16/1909/106R
 - S.15/2804/OUT
- 6.3.3 The location of the identified committed developments in relation to the development site is illustrated in **Figure 6.2** below:

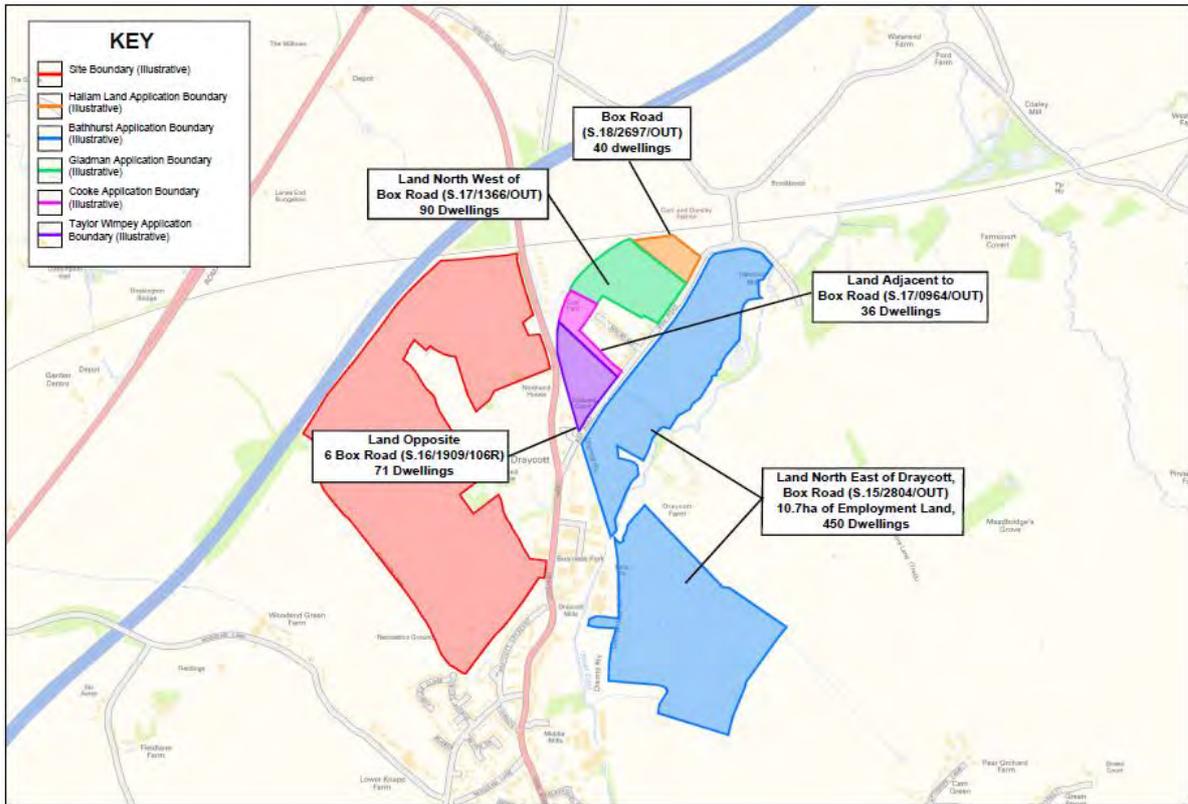


Figure 6.2– Committed Developments Location

6.3.4 The forecast traffic movements arising from the identified committed developments will be taken as additional to the baseline traffic flow to enable a future year “Do Minimum” scenario to be established. The distribution of such traffic across the study network is in accordance with information extracted from supporting TAs and Transport Statements associated with these sites. Where the traffic assignment does not extend onto the study network of this TA, the associated vehicle movements have been proportionally distributed as consistent with the travel pattern adopted for the proposed development outlined in **Section 7** below.

6.3.5 It is considered that these developments would provide the majority of traffic growth within the local area since 2015 and for future years. As such, the application of further growth, for example using factors as extracted from Temprow, is neither considered necessary nor appropriate.

6.3.6 The forecast committed development traffic along the proposed study highway network are presented in the traffic flow diagrams at **Appendix F**.

6.4 Future Year Baseline Traffic

6.4.1 The future year baseline traffic will be established by combining the forecast committed development traffic to the observed 2015 AM and PM Peak baseline traffic as presented in the traffic flow diagrams at **Appendix F**.

7 Development Traffic Flows

7.1 Introduction

- 7.1.1 This section of the report sets out the parameters that have been adopted in forecasting the associated development traffic generation, modal splits, and assignment, that will be later used to assess the development impact along the local highway network.
- 7.1.2 This assessment accounts for the fact that two development options are proposed for the site. Thus, the associated development traffic implications have been established and considered respectively for each scheme in the section below.
- 7.1.3 It is noted that Jubb are also in consultation with the LHA in relation to further modelling using the Gloucestershire County Wide Traffic Model. Further subsequent analysis will also be submitted to the LHA following use of this model.

7.2 Initial traffic generation using the TRICS database

- 7.2.1 Initial peak hour vehicle trip rates of the proposals have been calculated for Private Housing (i.e. using comparative survey sites within the Housing Privately Owned TRICS category).
- 7.2.2 The obtained full TRICS reports are included within Appendix D of the aforementioned scoping note included as **Appendix B** of this TA. The correlated vehicle trip rates for the identified highway AM and PM peaks of 08:00-0900 and 17:00-18:00, and subsequent trip generation for the development options are summarised in **Table 7.1** below.

Residential Category	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
	IN	OUT	Total	IN	OUT	Total
Vehicle Trip Rates	0.134	0.371	0.505	0.338	0.161	0.499
Option 1 – 1030 dwellings	138	382	520	348	166	514
Option 2 – 950 dwellings	128	352	480	321	153	474

Table 7.1 Vehicle Trip Rates and Initial Traffic Generation (Based on TRICS)

- 7.2.3 These trip rates do not take account of appropriate internalisation adjustments to take account of nearby local Convenience Shopping (i.e. SPAR) and Employment facilities (i.e. Draycott Business Park) that are located in the vicinity of the site and are therefore more likely to be undertaken by active modes (i.e. on foot or by bicycle). Details of these adjustments, which are based on the principles set out in the scoping note included as **Appendix B**, are discussed below.
- 7.2.4 The primary school, forming part of the Option 2 Scheme, will primarily be introduced to serve the residential proposals. Hence, it is assumed that the school itself would not create any impact on the nearby highway network as primary trips relating to this facility would be retained within the site. However, adjustments are required to take account of the fact that journeys would be retained within the site if this use is included for and would likely also be carried out via active modes of transport. These required adjustments, which are based on the principles set out in the scoping note included as **Appendix B**, are discussed below.

7.3 Adjustments to Vehicle Trip Rates

Adjustment to take account of Employment Trips

- 7.3.1 As discussed, the proposals are located adjacent to the Draycott Business park. Thus, it is likely that a number of employment journeys would be undertaken between the site and this business park, and, given the short distance would likely be carried out on foot. This would therefore result in a subsequent reduction in vehicle journeys.
- 7.3.2 To forecast the total number of journeys this would account for, 2011 Census data was interrogated to ascertain the number of people likely to live and work within the same area. Thus, the internal journey to work vehicle data associated with the "Stroud 011" MSOA, which is representative of the development area, has been reviewed. The location of this MSOA is highlighted in **Figure 7.1** below.

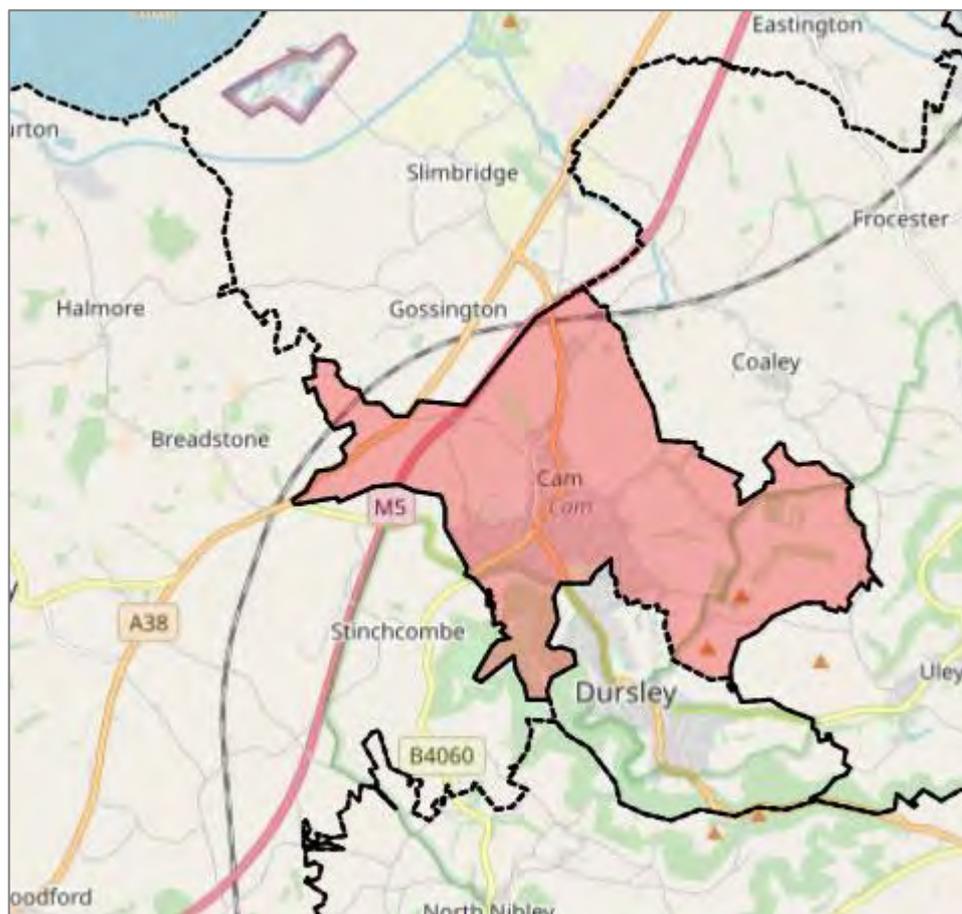


Figure 7.1 – Location of Northampton 004 MSOA.

- 7.3.3 This analysis demonstrates that approximately 13% of the working population within the "Stroud 011" MSOA that drive to work also work within this same area.
- 7.3.4 On review of the employment areas within the "Stroud 011" MSOA it is evident that Draycott Business Park would make up a significant proportion of these internal journeys within the MSOA. On this basis it is proposed that 5% reduction be applied to all vehicle journeys to and from the residential development to take account of the fact that these trips would be short in distance and therefore unlikely to be carried out by car. This reduction is summarised in **Table 7.2** below.

Employment Reduction	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
	IN	OUT	Total	IN	OUT	Total
Option 1 – 1030 dwellings	-7	-19	-26	-17	-8	-26
Option 2 – 950 dwellings	-6	-18	-24	-16	-8	-24

Table 7.2 – Vehicle reductions to take into account internal Employment journeys

Adjustment to take account of Convenience Shopping Trips

- 7.3.5 As discussed above a local petrol station convenience store (i.e. SPAR) is located adjacent to the eastern boundary of the site. It is therefore expected that the local store would account for a number of AM and PM convenient shopping trips. Thus, to calculate the potential internalisation, associated information has been gathered from the National Travel Survey (NTS); the latest available series of household data which provides a data source at national level on personal travel in England.
- 7.3.6 NTS Table 502 of the NTS provides details of the “Trip start time by trip purpose (Monday to Friday only)” and sub-tables which split the trips into specific modes. A peak hour summary of data for car/van driver is provided as **Table 7.3** below. Full details of this NTS table are also included as **Appendix G** of this TA.

Journey Purpose	AM Peak (08:00-09:00)	PM Peak (17:00-18:00)
Commuting	31%	38%
Business	6%	5%
Education	1%	0%
Escort Education	28%	3%
Shopping	5%	13%
Personal business	23%	23%
Visiting Friends / Sport / Entertainment	5%	15%
Holiday / Day Trip	2%	3%

Table 7.3 – Summary of Peak Hour Journey Purpose – As Extracted from NTS Table 0502

- 7.3.7 It can be seen from **Table 7.3** that shopping comprises a proportion of the main journey purpose during the reviewed peak hours, equating to 5% in the AM peak and 13% within the PM.
- 7.3.8 Retail trips in the morning peak are likely to consist of more convenience based journeys (e.g. to pick up day to day food products) and therefore it is likely that the nearby local centre would account for the most part all of the shopping journeys (i.e. the full 5% as outlined within the NTS). However, evening journeys would most likely encompass a broader range of shopping journeys which means that lower proportion of all shopping journeys would be convenience based in this peak (i.e. lower than the 13% as identified by the NTS). On this basis it is considered reasonable and robust to assume a 5% reduction be applied to vehicle journeys in both peaks to take account of the fact that convenience journeys would not require a significant journey and would therefore be more likely to be carried out on foot rather than by car. This reduction is summarised in **Table 7.4** below.

Shopping Reduction	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
	IN	OUT	Total	IN	OUT	Total
Option 1 – 1030 dwellings	-7	-19	-26	-17	-8	-26
Option 2 – 950 dwellings	-6	-18	-24	-16	-8	-24

Table 7.4 – Vehicle reductions to account for nearby convenience trips

Internalisation of Education Trips

- 7.3.9 As aforementioned, the option 2 proposals will also see the delivery of a primary school onsite to serve the residential proposals. Thus, it is evident that this will further reduce the requirement to travel outside of the site by private car for escorted education journeys.
- 7.3.10 A trip attraction calculation has been undertaken of the 1.5 form entry primary school to ascertain the level of internalisation that would be derived from this use. Trip rates have therefore been calculated based on comparative Primary School survey sites within the TRICS database.
- 7.3.11 The resultant trip rates are summarised in **Table 7.5** below with full TRICS output also provided as Appendix F of the scoping note (**Appendix B**). In addition, **Table 7.5** also provides details of the total forecast traffic attraction for the proposed Primary School, which, it is assumed, would provide education for 315 pupils (i.e. 1.5 form entry).

	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
	IN	OUT	Total	IN	OUT	Total
Trip Rate (per pupil)	0.314	0.230	0.544	0.021	0.034	0.055
Trip Generation (315 pupils)	99	72	171	7	11	17

Table 7.5 – Vehicle Traffic Attraction (Proposed Primary School)

- 7.3.12 It is noted that the vehicle trips associated with the Primary School would predominantly consist of parent drop off and pickup trips. Evidently some of these trips would be linked with other journeys, most likely journeys to work, and therefore not all of the trips outlined within **Table 7.5** would be retained within the site.
- 7.3.13 Notwithstanding this, guidance outlined within the “Travel during the morning peak” section of the National Travel Survey factsheet titled “Trip Chaining: 2002-2014”, indicates that some 75% of primary school journeys are not linked with a journey to work trip. On this basis it is assumed that 75% of the journeys shown in **Table 7.5** would be retained within the site and can therefore accordingly be removed from the total traffic generation calculated for the residential development.
- 7.3.14 On this basis, as shown in **Table 7.6** below, the Primary School vehicle trip attraction figures shown in **Table 7.5** have been reduced by 25% to calculate the proportion of these school journeys that would be retained within the site. The subsequent reciprocal and opposing reduction that would be applied to the residential trips to take account of this internalisation are also shown in **Table 7.6**.

Education Reduction	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
	IN	OUT	Total	IN	OUT	Total
Option 2 – Primary School Journeys Retained within Site	74	54	129	5	8	13
Option 2 – Ssubsequent reduction to residential vehicle generation	-54	-74	-129	-8	-5	-13

Table 7.6 – Vehicle Traffic Adjustments for Internal Education Journeys

7.4 Residual External Development Traffic

7.4.1 Applying the above adjustments associated with employment, shopping and primary education purposes to the forecast residential trip generation as shown in **Table 7.1**, the residual residential traffic generation that would impact on the external highway network are subsequently established in **Table 7.7** below.

Education Reduction	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
	IN	OUT	Total	IN	OUT	Total
Option 1 – 1030 dwellings	124	344	468	313	149	463
Option 2 – 950 dwellings	61	243	303	281	133	414

Table 7.7 Residual Residential External Traffic Generation

7.5 Traffic Distribution

7.5.1 To provide a representation of likely traffic distribution along the external study highway network, directional traffic assignment that was previously developed in support of for the neighbouring Bathurst Ltd development (ref: S.15/2804/OUT) has been obtained from the associated TA for the purposes of this assessment.

7.5.2 The adopted distribution model was established based on calculations using 2011 journey to work census data which is summarised within Appendix I of the neighbouring Bathurst Ltd development TA with subsequent percentage distribution set out as Figure 2.1 of the Bathurst Ltd development TA.

7.5.3 For the purposes of this assessment, a split is applied between the northern and southern site vehicular access junctions of 2/3rd to 1/3rd respectively. The resulting external traffic distribution and development traffic flows are shown in **Appendix F**.

7.6 Travel Pattern

7.6.1 For the sake of consistency, modal splits that were previously established for the residential element of the consented Bathurst Ltd development has been abstracted from the supporting Travel Plan dated November 2015. The adopted travel pattern was developed using the 2011 journey to work census data for the area of north-east of Cam. The derived travel patterns are recreated in **Table 7.8** below and will be adopted as a baseline condition to inform the site Travel Plan.

Method of Travel	Mode Split
Rail	1%
Bus	1%
Car (driver)	50%
Car (passenger)	4%
Motorcycle	1%
Bicycle	1%
Walk	6%
Work from home	4%
Not in employment	32%
Total	100%

Table 7.8 – Modal Split

7.7 Construction Impact

- 7.7.1 The anticipated impact of the construction traffic associated with the proposed development has been assessed based on experience of other comparable schemes within the area. Throughout the construction of the proposed development, various plant, equipment, and materials will need to be transported to/from the site.
- 7.7.2 The related construction traffic will comprise two principle forms. Firstly, workforce-related traffic will comprise the arrival/departure of the workforce associated with the development of the site. Secondly, delivery-related traffic will comprise traffic associated with deliveries, plant movements, and material movements for export/import of materials.

Work Related

- 7.7.3 Typical site hours require workers to arrive and depart outside the peak period and therefore the peak hour impacts associated with this element of construction traffic are small. In addition, the number of workforce related movements are likely to be less than the total movement associated with the finished development and therefore present less onerous traffic conditions.

Delivery and Servicing

- 7.7.4 Deliveries and earth moving operations can be managed to avoid traffic peaks. Furthermore, an earthworks strategy will aim to retain as much material on site as possible.
- 7.7.5 A Construction Management Plan, detailing the hours of operation and maximum vehicle movements, will be agreed with relevant consultees prior to the construction work taking place (i.e. when a contractor has been appointed) to ensure traffic impact is minimised.

8 Junction Capacity Assessments

8.1 Preamble

8.1.1 Local Highway Authority Guidance on Transport Assessment states that junction assessment should be conducted where material changes in traffic volumes are experienced. In view of this an impact assessment has been undertaken to determine the potential effects of the proposal on the local highway network.

8.1.2 In light of this, the percentage increase in traffic (i.e. above that of the forecast future year base flow) as a result of the proposed development is summarised below in **Table 8.1** (AM Peak) and **Table 8.2** (PM Peak).

Existing Junctions	Approach	AM				
		Future Baseline	Option 1	%	Option 2	%
Bristol Road/A4135 Roundabout	Bristol Rd North	706	24	3.34%	12	1.64%
	A4135	797	65	8.20%	46	5.79%
	Bristol Rd South	367	0	0.00%	0	0.00%
	St John's Road	137	0	0.00%	0	0.00%
	Total Inflow	2008	89	4.43%	58	2.88%
A4135 / Box Road Junction	A4135 North	507	105	20.63%	72	14.24%
	Box Road	347	30	8.58%	15	4.22%
	A4135 South	913	90	9.90%	55	6.01%
	Total Inflow	1767	225	12.72%	142	8.02%
Noel Lee Way/Cam Pitch /Chapel St	High Street	669	62	9.26%	44	6.54%
	Neol Lee Way	110	2	2.26%	1	1.11%
	Chapel Street	267	2	0.93%	1	0.46%
	Cam Pitch	785	57	7.27%	28	3.58%
	Total Inflow	1831	124	6.77%	74	4.05%
Cam Pitch/Tils Down/Woodfield Rd	Cam Pitch	643	158	24.59%	112	17.37%
	Tils Down	561	17	3.09%	9	1.52%
	Woodfield Rd	310	40	12.79%	20	6.29%
	Total Inflow	1515	215	14.21%	140	9.23%
Tils Down/Dusley Road/Kingshill Rd	Tils Down	519	48	9.27%	34	6.55%
	Dusley Road	356	0	0.00%	0	0.00%
	Kingshill Rd	775	17	2.24%	9	1.10%
	Total Inflow	1650	66	3.97%	43	2.58%
Bull Pitch/Lister Street/Woodmancote	Bull Pitch	543	48	8.88%	34	6.27%
	Woodmacote	273	15	5.44%	7	2.68%
	Lister Street	349	2	0.71%	1	0.35%
	Total Inflow	1165	66	5.63%	43	3.65%
Dursley Road/The Avenue/Taits Hill Road	Taits Hill Road	268	32	12.02%	16	5.91%
	Dusley Road	634	21	3.26%	15	2.30%
	The Avenue	192	7	3.87%	4	1.90%
	Total Inflow	1094	60	5.51%	34	3.12%

Existing Junctions	Approach	AM				
		Future Baseline	Option 1	%	Option 2	%
A38 / Berkely Road Junction	The A38 North	435	0	0.00%	0	0.00%
	Berkely Road	434	89	20.59%	63	14.54%
	The A38 South	575	32	5.61%	16	2.76%
	Total Inflow	1445	122	8.42%	79	5.47%

Table 8.1 Percentage Increase as result of Development Traffic – AM Peak

Existing Junctions	Approach	PM				
		Future Baseline	Option 1	%	Option 2	%
Bristol Road/A4135 Roundabout	Bristol Rd North	994	59	5.98%	53	5.37%
	A4135	565	28	5.01%	25	4.47%
	Bristol Rd South	423	0	0.00%	0	0.00%
	St John's Road	171	0	0.00%	0	0.00%
	Total Inflow	2153	88	4.08%	79	3.65%
A4135 / Box Road Junction	A4135 North	814	62	7.56%	55	6.76%
	Box Road	346	75	21.71%	67	19.49%
	A4135 South	621	126	20.29%	113	18.20%
	Total Inflow	1781	263	14.75%	235	13.22%
Noel Lee Way/Cam Pitch /Chapel St	High Street	949	27	2.83%	24	2.52%
	Neol Lee Way	304	6	2.06%	6	1.85%
	Chapel Street	240	6	2.61%	6	2.34%
	Cam Pitch	623	144	23.10%	129	20.74%
	Total Inflow	2116	183	8.66%	164	7.77%
Cam Pitch/Tils Down/Woodfield Rd	Cam Pitch	757	69	9.05%	61	8.08%
	Tils Down	437	44	10.03%	39	9.00%
	Woodfield Rd	386	100	25.93%	90	23.28%
	Total Inflow	1580	213	13.45%	190	12.05%
Tils Down/Dusley Road/Kingshill Rd	Tils Down	434	21	4.81%	19	4.29%
	Dusley Road	462	0	0.00%	0	0.00%
	Kingshill Rd	744	44	5.89%	39	5.29%
	Total Inflow	1640	65	3.94%	58	3.53%
Bull Pitch/Lister Street/Woodmacote	Bull Pitch	594	21	3.51%	19	3.14%
	Woodmacote	345	38	10.88%	34	9.77%
	Lister Street	309	6	2.03%	6	1.82%
	Total Inflow	1248	65	5.18%	58	4.65%
Dursley Road/The Avenue/Taits Hill Road	Taits Hill Road	657	81	12.39%	73	11.13%
	Dusley Road	449	9	1.99%	8	1.78%
	The Avenue	270	19	6.96%	17	6.25%
	Total Inflow	1375	109	7.93%	98	7.12%
A38 / Berkely Road Junction	The A38 North	438	0	0.00%	0	0.00%
	Berkely Road	275	39	14.10%	35	12.59%
	The A38 South	855	81	9.52%	73	8.55%
	Total Inflow	1567	120	7.66%	108	6.87%

Table 8.2 Percentage Increase as result of Development Traffic – PM Peak

- 8.1.3 It is noted that an increase of less than 10% is generally within the range of typical daily variation and therefore insignificant in terms of traffic impact. Thus, the operational efficiency of junctions, where a material change greater than 10% in traffic volume is forecast, has been subsequently assessed. Junction capacity tests are subsequently carried out using the industrial standard software at the following junctions:
- *The A4135 / Box Road Junction*
 - *Dursley Road/The Avenue/Taits Hill Road*
 - *The A38 / Berkely Road Junction*
 - *Cam Pitch/Tils Down/Woodfield Rd Junction*
 - *Noel Lee Way/Cam Pitch/Chapel Street Junction*
 - *Bull Pitch/Lister Street/Woodmancote*
 - *The Site Access Junctions*
- 8.1.4 The operational capacity of the above key junctions has been assessed for the AM and PM peak as defined in the previous Section, for the following traffic flow scenarios:
- *2015 Observed*
 - *Future Year without Development (i.e. Observed Flows + Committed Development Traffic)*
 - *Future Year with Development (i.e. Observed Flows + Committed Development Traffic + Development Traffic)*
- 8.1.5 The turning movements forecast in these scenarios are shown in the traffic flow diagrams presented in **Appendix F**.
- 8.1.6 A comparison of the varying impacts of each scenario will allow the performance of the assessed junction to be viewed in the context of background traffic flows, and with the addition of traffic flows generated by the proposed development. Therefore, the material impact of the proposed developments on the local highway network can be evaluated.
- 8.1.7 In order to assess the performance and thus determine the saturation capacity of the existing highway, junction capacity tests were conducted at the identified junctions using industrial standard software (i.e. Junctions 8 and LINSIG 3).
- 8.1.8 The results of these assessments provide details of Ratio of Flow to Capacity (RFC) for the existing priority junctions / roundabout junctions and Degree of Saturation (DoS) for the proposed signal junction. It is noted that where an RFC or DoS value is shown to exceed a value of 1 the associated approach is calculated to exceed capacity.
- 8.1.9 In addition to the above a review of the traffic impact on the trunk road network of the M5 is also provided below which looks at the proportional impact in terms of traffic.

8.2 The A4135 / Box Road Junction

8.2.1 The A4135 Draycott forms the major arm of this priority T-junction in a north-south direction with Box Road joining from the east as the give way arm. PICADY modeling results of the forecast baseline condition as well as the 'With Development' scenarios for this priority T-junction are presented in **Table 8.3** below. The full output is attached in **Appendix H**.

Approach	AM Peak			PM Peak		
	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
2015 Observed Baseline						
Box Road – Draycott (S)	0.17	6.76	0.14	0.23	8.25	0.19
Box Road – Draycott (N)	0.14	12.59	0.12	0.20	14.51	0.16
Draycott (S) – Draycott (N) & Box Rd	0.29	8.46	0.22	0.24	9.41	0.19
Future Year + Committed Development						
Box Road – Draycott (S)	0.72	13.07	0.42	1.02	16.21	0.51
Box Road – Draycott (N)	1.40	35.08	0.59	1.01	31.54	0.51
Draycott (S) – Draycott (N) & Box Rd	1.48	13.78	0.58	0.85	13.06	0.44
Future Year + Committed Development + Proposed Dev Option 1 without School						
Box Road – Draycott (S)	1.85	32.94	0.66	11.11	167.87	0.97
Box Road – Draycott (N)	3.67	84.09	0.81	8.36	194.41	0.95
Draycott (S) – Draycott (N) & Box Rd	2.34	18.33	0.70	1.09	14.08	0.49
Future Year + Committed Development + Proposed Dev Option 2 with School						
Box Road – Draycott (S)	1.03	18.30	0.51	7.91	122.37	0.93
Box Road – Draycott (N)	2.27	53.99	0.70	6.24	150.69	0.91
Draycott (S) – Draycott (N) & Box Rd	2.02	16.55	0.66	1.06	13.97	0.49

Table 8.3 – Draycott / Box Road Junction PICADY modelling results

8.2.2 It can be seen from **Table 8.3** that the above junction is shown to work within capacity with a RFC below 1 on all arms. Hence the additional traffic flow associated with the proposals will not result in an unacceptable impact at this location.

8.3 Dursley Road/The Avenue/Taits Hill Road

8.3.1 Taits Hill Road and Dursley Road forms the major arm of this priority T-junction in a north-east direction with The Avenue joining from the west as the give way arm. The modeling results of the forecast baseline condition as well as the 'With Development' scenarios for this priority T-junction are presented in **Table 8.4** below. The full output is attached in **Appendix H**.

Approach	AM Peak			PM Peak		
	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
2015 Observed Baseline						
The Avenue – Taits Hill Rd	0.03	7.25	0.03	0.04	8.12	0.04
The Avenue – Dursley Rd	0.47	10.70	0.32	1.24	18.93	0.56
Taits Hill Road – The Avenue	0.04	6.70	0.04	0.54	9.21	0.35
Future Year + Committed Development						
The Avenue – Taits Hill Rd	0.03	7.54	0.03	0.05	8.65	0.05
The Avenue – Dursley Rd	0.57	11.69	0.36	1.46	21.34	0.60
Taits Hill Road – The Avenue	0.04	6.86	0.04	0.55	9.40	0.35
Future Year + Committed Development + Proposed Dev Option 1 without School						
The Avenue – Taits Hill Rd	0.03	7.87	0.03	0.05	9.77	0.05
The Avenue – Dursley Rd	0.63	12.72	0.39	1.94	26.58	0.66
Taits Hill Road – The Avenue	0.04	7.13	0.04	0.55	9.46	0.36
Future Year + Committed Development + Proposed Development Option 2 with School						
The Avenue – Taits Hill Rd	0.03	7.61	0.03	0.05	9.66	0.05
The Avenue – Dursley Rd	0.60	12.02	0.38	1.90	26.09	0.66
Taits Hill Road – The Avenue	0.04	6.91	0.04	0.55	9.45	0.36

Table 8.4 – The Avenue/Dursley Road/Taits Hill Road Junction PICADY modelling results

- 8.3.2 The modelling output demonstrates that the existing junction layout will offer sufficient capacity to accommodate the traffic arising from both committed and proposed development with notional queueing delay predicted along all arms.
- 8.3.3 Comparison between the baseline and 'With Development' scenarios demonstrates that the development proposal is not forecast to lead to any material increase in queueing delay with a maximum increase of less than 1 pcu along all arms.
- 8.3.4 Hence, the addition of the traffic generated by the proposed development is not forecast to result in a severe cumulative residual impact and thus no mitigation works are required.

8.4 The A38 / Berkely Road Junction

- 8.4.1 The A38 and Berkley Road forms a series of priority junctions at this location with vehicle movements turning in and out of Berkley Road giving way to the through movements along the A38 and Berkley Road. A right turn lane is available along the A38 which allows vehicles arriving from the south-west direction to safely wait in the middle of the road before turning right onto Berkley Road.
- 8.4.2 The modeling results of the forecast baseline condition as well as the 'With Development' scenarios for this priority T-junction are presented in **Table 8.5** below. The full output is attached in **Appendix H**.

Approach	AM Peak			PM Peak		
	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
2015 Observed Baseline						
Junction 1: Berkley Rd – A38 (S)	1.42	13.67	0.59	0.57	8.85	0.36
Junction 1 : A38 (S) – Berkley Rd & A38 (N)	0.55	8.86	0.36	1.58	14.74	0.62
Junction 2: Berkley Rd – A38 (S) & A38 (N)	0.05	6.50	0.04	0.05	6.68	0.05
Junction 3: A38 (N) – A38 (S) & Berkley Rd	0.04	5.72	0.04	0.08	6.38	0.07
Junction 3: Berkley Rd – A38 (N)	0.05	6.95	0.05	0.06	7.51	0.05
Future Year + Committed Development						
Junction 1: Berkley Rd – A38 (S)	1.80	15.98	0.65	0.63	9.21	0.39
Junction 1 : A38 (S) – Berkley Rd & A38 (N)	0.60	9.18	0.37	1.87	16.43	0.65
Junction 2: Berkley Rd – A38 (S) & A38 (N)	0.05	6.57	0.04	0.05	6.73	0.05

Approach	AM Peak			PM Peak		
	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
Junction 3: A38 (N) – A38 (S) & Berkley Rd	0.04	5.74	0.04	0.08	6.46	0.08
Junction 3: Berkley Rd – A38 (N)	0.05	6.98	0.05	0.06	7.59	0.05
Future Year + Committed Development + Proposed Dev Option 1 without School						
Junction 1: Berkley Rd – A38 (S)	3.54	26.28	0.79	0.04	5.89	0.04
Junction 1 : A38 (S) – Berkley Rd & A38 (N)	0.74	9.99	0.43	3.61	26.55	0.79
Junction 2: Berkley Rd – A38 (S) & A38 (N)	0.05	6.57	0.04	0.05	6.73	0.05
Junction 3: A38 (N) – A38 (S) & Berkley Rd	0.04	5.82	0.04	0.09	6.73	0.08
Junction 3: Berkley Rd – A38 (N)	0.05	7.08	0.05	0.06	7.90	0.06
Future Year + Committed Development + Proposed Dev Option 2 with School						
Junction 1: Berkley Rd – A38 (S)	2.85	22.14	0.74	0.04	5.89	0.04
Junction 1 : A38 (S) – Berkley Rd & A38 (N)	0.66	9.57	0.40	3.34	24.97	0.78
Junction 2: Berkley Rd – A38 (S) & A38 (N)	0.05	6.57	0.04	0.05	6.73	0.05
Junction 3: A38 (N) – A38 (S) & Berkley Rd	0.04	5.78	0.04	0.09	6.70	0.08
Junction 3: Berkley Rd – A38 (N)	0.05	7.03	0.05	0.06	7.87	0.06

Table 8.5 – The A38/Berkely Road Junctions PICADY modelling results

- 8.4.3 The modelling output demonstrates that the existing junction layouts will offer sufficient capacity to accommodate the traffic arising from both committed and proposed development with notional queueing delay predicted along all arms.
- 8.4.4 Comparison between the baseline and 'With Development' scenarios demonstrates that the development proposal is not forecast to lead to any material increase in queueing delay with a maximum increase of less than 2 pcu along all arms.
- 8.4.5 Hence, the addition of the traffic generated by the proposed development is not forecast to result in a severe cumulative residual impact and thus no mitigation works are required.

8.5 Cam Pitch/Tiltdown/Woodfield Rd Junction

- 8.5.1 Woodfield Road/Tiltdown junction is a 3-arm mini roundabout with a single lane approach available along all arms. The junction itself was assessed as part of the Stroud Local Plan Capacity Assessment (December 2014, referred to as H1).
- 8.5.2 The H1 assessment demonstrated that the existing geometric arrangement of this mini roundabout has failed to provide sufficient capacity to accommodate the forecast traffic growth in area, and a significant highway mitigation scheme was subsequently proposed as part of the Stroud Local Plan Capacity Assessment. The proposal will see the conversion of this junction into a standard roundabout with single lane approach flaring into 2-lane entry at the give way lines on the A4135.
- 8.5.3 The established ARCADY model for the mitigation scheme at this junction has been obtained from the TA submitted in support of the neighbouring consented Bathurst Ltd development (ref: S.15/2804/OUT). The outturn junction performance indicators for all the testing scenarios are summarised in **Table 8.6** below with the full report included within **Appendix H**.

Approach	AM Peak			PM Peak		
	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
2015 Observed Baseline						
Tiltdown (N)	0.43	3.32	0.30	0.36	3.31	0.27
Woodfield Rd	0.25	3.48	0.20	0.35	3.65	0.27
Tiltdown Rd (S)	0.70	4.73	0.41	1.27	6.42	0.56
Future Year + Committed Development						
Tiltdown (N)	0.59	3.79	0.37	0.42	3.48	0.30
Woodfield Rd	0.33	3.89	0.25	0.42	3.91	0.30
Tiltdown Rd (S)	0.99	5.57	0.50	1.45	6.92	0.59
Future Year + Committed Development + Proposed Development Option 1 without School						
Tiltdown (N)	0.67	4.18	0.40	0.50	3.76	0.33
Woodfield Rd	0.40	4.12	0.29	0.61	4.53	0.38
Tiltdown Rd (S)	1.63	7.37	0.62	1.82	7.98	0.65
Future Year + Committed Development + Proposed Development Option 2 with School						
Tiltdown (N)	0.64	4.04	0.39	0.49	3.73	0.33

Approach	AM Peak			PM Peak		
	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
Woodfield Rd	0.37	4.00	0.27	0.59	4.46	0.37
Tiltdown Rd (S)	1.41	6.74	0.59	1.78	7.85	0.64

Table 8.6 – Woodfield Rd / Tiltdown (Mitigated) Roundabout Modelling Results

- 8.5.4 As can be seen above, the proposed mitigation scheme will offer sufficient capacity to accommodate the traffic arising from both committed and proposed development with notional queueing delay predicted along all arms.
- 8.5.5 Comparison between the baseline and 'With Development' scenarios demonstrates that the development proposal is not forecast to lead to any material increase in queueing delay with a maximum increase of less than 1 pcu along all arms.
- 8.5.6 Hence, the addition of the traffic generated by the proposed development is not forecast to result in a severe cumulative residual impact and thus no mitigation works are required.

8.6 Noel Lee Way/Cam Pitch/Chapel Street Junction

- 8.6.1 Noel Lee Way/Cam Pitch/Chapel Street Junction is a 4-arm mini roundabout with a single lane approach available along all arms.
- 8.6.2 The modeling results of the forecast baseline condition as well as the 'With Development' scenarios for this junction are presented in **Table 8.7** below. The full output is attached in **Appendix H**.

Approach	AM Peak			PM Peak		
	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
2015 Observed Baseline						
High Street	1.55	10.90	0.61	23.63	115.61	0.99
Noel Lee Way	0.28	9.42	0.22	2.93	37.12	0.76
Chapel Street	2.69	38.59	0.74	19.74	332.76	1.06
Cam Pitch	1.41	8.66	0.59	1.16	7.90	0.54
Future Year + Committed Development						
High Street	3.70	20.31	0.79	176.81	727.13	1.22
Noel Lee Way	0.36	11.86	0.27	4.29	53.39	0.82

Chapel Street	9.04	130.39	0.93	63.54	1160.69	1.36
Cam Pitch	3.60	16.88	0.79	1.64	9.53	0.62
Future Year + Committed Development + Proposed Development Option 1 without School						
High Street	5.99	30.63	0.86	333.68	1354.51	1.43
Noel Lee Way	0.41	13.18	0.29	5.50	67.58	0.86
Chapel Street	20.33	282.45	1.04	89.52	1835.83	1.58
Cam Pitch	5.06	22.38	0.84	4.78	23.09	0.83
Future Year + Committed Development + Proposed Development Option 2 with School						
High Street	5.09	26.57	0.84	198.98	815.17	1.25
Noel Lee Way	0.39	12.72	0.28	4.75	58.31	0.84
Chapel Street	15.80	222.26	1.00	73.08	1359.46	1.42
Cam Pitch	4.22	19.20	0.81	3.02	14.66	0.75

Table 8.7 – High Street / Chapel Street / Cam Pitch / Noel Lee Way – Mini Roundabout

- 8.6.3 As can be seen above, the 4-arm mini roundabout is already running in excess of its design capacity for the observed baseline scenario with an RFC value of 1.06 at Chapel Street in the PM Peak.
- 8.6.4 Without any significant highway enhancement, the existing junction arrangement becomes increasingly sensitive to any additional traffic and forecast junction performance continues to deteriorate when taking into account the traffic arising from the committed and proposed developments with prolonged queueing delay forecast at High Street and Chapel Street.
- 8.6.5 In order to release network capacity and provide a long term transport solution at this bottleneck junction, a highway mitigation scheme is proposed that will see localised road realignment and widening to upgrade the current junction form to a compact roundabout with increased ICD and entry approach width along all arms.
- 8.6.6 The forecast performance indicators for the improved roundabout are summarised in **Table 8.8** below. In addition, a diagram showing this proposed improvement is also presented as **Appendix I**.

Approach	AM Peak			PM Peak		
	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
2015 Observed Baseline						
High Street	0.64	4.44	0.39	1.60	7.58	0.62
Noel Lee Way	0.13	4.44	0.12	0.57	6.97	0.36
Chapel Street	0.43	5.93	0.30	0.45	7.26	0.31
Cam Pitch	1.23	7.57	0.55	1.03	6.99	0.51
Future Year + Committed Development						
High Street	1.02	5.48	0.50	3.25	12.49	0.77
Noel Lee Way	0.15	4.93	0.13	0.74	8.76	0.43
Chapel Street	0.50	6.76	0.33	0.62	9.31	0.38
Cam Pitch	2.83	13.13	0.74	1.50	8.74	0.60
Future Year + Committed Development + Proposed Development Option 1 without School						
High Street	1.23	6.05	0.55	8.27	27.93	0.90
Noel Lee Way	0.16	5.15	0.14	0.96	11.29	0.49
Chapel Street	0.53	7.15	0.35	0.82	12.17	0.45
Cam Pitch	3.84	16.75	0.80	3.98	19.12	0.80
Future Year + Committed Development + Proposed Development Option 2 with School						
High Street	1.16	5.86	0.54	3.62	13.61	0.79
Noel Lee Way	0.16	5.08	0.14	0.78	9.14	0.44
Chapel Street	0.52	7.02	0.34	0.66	9.78	0.40
Cam Pitch	3.27	14.71	0.77	2.69	13.03	0.73

Table 8.8 – High Street – Chapel Street – Cam Pitch – Noel Lee Way – Roundabout

- 8.6.7 As can be seen above there is a significant improvement in capacity for the mitigated layout of the junction. The improved junction arrangement will offer sufficient capacity to accommodate the vehicle movements forecast arising from both the committed and proposed development proposals with a highest RFC value of 0.9 forecast at High Street in the PM Peak for the Future Year with Development Option 1 scenario.
- 8.6.8 Hence, the proposed scheme would not only mitigate the forecast impact of the proposed development at this junction but would also bring wider betterment with significant capacity improvements. Notwithstanding this point it is evident that this improvement would present present very much a Predict and Provide approach to mitigation at this junction that would seek to accommodate increased traffic levels. However, it is considered that, given the character of the area, a Decide and Provide option may be more preferential that seeks to restrict traffic and instead encourage pedestrian and cyclist movements.
- 8.6.9 Thus, as an alternative, it is proposed that a traffic management scheme could also be introduced at this location through a combination of raised table, new uncontrolled level crossings and colored surfacing to reduce the traffic speed through the village centre and improve the appearance of public realm for pedestrians. Such measures would reduce the impact of through traffic in the village centre and improve the travel environment for pedestrians and cyclists. Details of the potential alternative are provided as **Appendix J**. Both highway enhancement options can be undertaken within the existing highway boundary.
- 8.6.10 The study demonstrates that the existing junction is already underperforming and suffers from prolonged delay and congestion issues experienced along High Street and Chapel Street. Without seeking any highway enhancements, the junction performance would further deteriorated by any incremental traffic growth as result of background traffic, as well as consented and proposed developments in the area.
- 8.6.11 Such capacity deficiency is innately imbedded in the network itself and should not be adressed by a single development alone. Instead, combined efforts should be sought from LHA and the wider development aspirations of different parties across the area to resolve this long-standing capacity issues and improve the overall transport system in Cam.

8.7 Bull Pitch/Lister Street/Woodmancote

- 8.7.1 Bull Pitch/Lister Street/Woodmancote Junction is a 3-arm mini roundabout with a single lane approach available along all arms.
- 8.7.2 The modeling results of the forecast baseline condition as well as the 'With Development' scenarios for this junction are presented in **Table 8.9** below. The full output is attached in **Appendix H**.

Approach	AM Peak			PM Peak		
	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
2015 Observed Baseline						
B4086	1.81	19.44	0.65	1.27	15.28	0.56

Approach	AM Peak			PM Peak		
	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
A4135 Woodmancote	0.77	13.22	0.44	1.66	19.11	0.63
A4135 Bull Pitch	1.10	8.11	0.53	1.33	9.04	0.57
Future Year + Committed Development						
B4086	2.20	23.13	0.69	1.52	17.91	0.61
A4135 Woodmancote	1.32	17.61	0.57	2.16	22.98	0.69
A4135 Bull Pitch	1.37	9.14	0.58	1.75	10.70	0.64
Future Year + Committed Development + Proposed Development Option 1 without School						
B4086	2.58	27.05	0.73	1.67	19.36	0.63
A4135 Woodmancote	1.51	19.11	0.60	3.21	31.06	0.77
A4135 Bull Pitch	1.69	10.41	0.63	1.93	11.41	0.66
Future Year + Committed Development + Proposed Development Option 2 with School						
B4086	2.44	25.68	0.71	1.65	19.15	0.63
A4135 Woodmancote	1.42	18.37	0.59	3.06	29.91	0.76
A4135 Bull Pitch	1.59	10.00	0.62	1.91	11.34	0.66

Table 8.9 – Bull Pitch/Lister Street/Woodmancote

- 8.7.3 As can be seen above, the roundabout offers sufficient capacity to accommodate the traffic arising from both committed and proposed development with notional queueing delay predicted along all arms.
- 8.7.4 Comparison between the baseline and 'With Development' scenarios demonstrates that the development proposal is not forecast to lead to any material increase in queueing delay with a maximum increase of 1 pcu along all arms.
- 8.7.5 Hence, the addition of the traffic generated by the proposed development is not forecast to result in a severe cumulative residual impact and thus no mitigation works are required.

8.8 Site Access Junctions

- 8.8.1 As stated in **Section 5**, the proposed vehicular accesses to the development will be directly off the A4135 via a new built roundabout to the north and a new signal-controlled junction in the south.
- 8.8.2 To ensure the adequacy of the proposed access junctions in terms of capacity, ARCADY and LINSIG tests (**Appendix H**) were undertaken to assess their operational capacity with the outturn junction performance summarised in **Table 8.10** and **Table 8.11** below.

Approach	AM Peak			PM Peak		
	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
Future Year + Committed Development + Proposed Development Option 1 without School						
A4135 (N)	2.10	8.68	0.68	1.28	6.44	0.56
Site Access	0.20	5.13	0.17	0.07	3.87	0.06
A4135 (S)	0.69	4.68	0.41	1.87	7.78	0.65
Future Year + Committed Development + Proposed Development Option 2 with School						
A4135 (N)	1.82	7.87	0.65	1.21	6.23	0.55
Site Access	0.13	4.81	0.12	0.06	3.84	0.05
A4135 (S)	0.65	4.51	0.39	1.82	7.63	0.65

Table 8.10 –Northern Site Access Junction

Link Number	Link Description	AM Peak		PM Peak	
		Deg of Sat	Queue	Deg of Sat	Queue
Future Year +Committed Development + Proposed Development Option 1 Without School					
1/1	Site Access – Right &Left	38.50%	2.50	23.00%	1.10
2/1	A4135 N - Ahead	47.50%	9.60	66.10%	16.50
2/2	A4135 N - Right	8.30%	0.20	12.00%	0.40
3/1	A4135 N – Ahead & Left	76.50%	23.60	60.20%	14.60
Future Year + Committed Development + Proposed Development Option 2 with School					
1/1	Site Access – Right &Left	26.80%	1.70	20.70%	1.00

Link Number	Link Description	AM Peak		PM Peak	
		Deg of Sat	Queue	Deg of Sat	Queue
2/1	A4135 N - Ahead	46.60%	9.20	65.90%	16.50
2/2	A4135 N - Right	4.00%	0.10	10.50%	0.40
3/1	A4135 N – Ahead & Left	72.50%	21.10	59.00%	14.10

Table 8.11 – Southern Site Access Junction

8.8.3 As can be seen above, both access junctions are predicted to operate well below their design capacity with negligible queueing delays forecast along all arms.

8.8.4 As such, the proposed access junctions offer suitable capacity to accommodate the predicted background traffic and the traffic generated by the proposed development, without interfering with the operation of the A4135.

8.9 Impact on Strategic Trunk Road Network

8.9.1 Details of the calculation of the previously agreed Bathhurst Ltd distribution which the above assessment has been based is included as Appendix I of the aforementioned scoping note (**Appendix B**). It is noted that this previously agreed Bathhurst Ltd development distribution does not extend to the M5 network with the most northernmost point extending to “Zone A” on the A38 just north of the A4135 junction and the most southerly point shown at “Zone G” on the A38 just south of Berkely Road. Jubb have reviewed and extended this distribution and have calculated that only 8% of development traffic would likely travel via the M5 using Junction 13 to the north and only 8% of development traffic would likely travel via the M5 using Junction 14 to the south. A summary of this calculation is provided as Appendix J of the scoping note (**Appendix B**).

8.9.2 The resultant calculated vehicle trips forecast to use each Motorway junction to access the M5 are set out below in **Table 8.13** (Option 1 impact) and **Table 8.14** (Option 2 impact) below. In comparison to the flows during the peak hours on the M5 between junction 13 and 14, which, as demonstrated in the traffic flows as extracted from the Highways England TRADS web site, as summarised as Appendix K of the scoping note (**Appendix B**), are typically in the region of 3,000 vehicles in either direction, these low traffic figures are unlikely to create significant impact. Thus, further assessment of the trunk road network is not considered to be required.

	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
	Arrivals	Departures	Total	Arrivals	Departures	Total
Junction 13 (North)	10	28	37	25	12	37
Junction 14 (South)	10	28	37	25	12	37

Table 8.13 – Forecast Traffic Volume Accessing M5 (Proposed Development Option 1 Without School)

	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
	Arrivals	Departures	Total	Arrivals	Departures	Total
Junction 13 (North)	5	19	24	22	11	33
Junction 14 (South)	5	19	24	22	11	33

Table 8.14 – Forecast Traffic Volume Accessing M5 (Proposed Development Option 2 With School)

9 Sustainable Transport

9.1 Preamble

9.1.1 The proposed development will promote measures that maximise the accessibility of the site by sustainable modes. The primary aim is to remove barriers and facilitate access for alternative means of travel.

9.2 Layout Design and Highway Improvements

9.2.1 To deliver a sustainable development, the proposed scheme will be sensitively designed to provide a high-quality layout and environment maximising transport sustainability and integration. Particular emphasis will be focused on the creation of safe routes through the site facilitating easy access by foot and cycle to both internal and external destinations.

9.2.2 The application site is well situated in relation to the local communities at where a range of shopping, social and educational facilities can be accessed. It can take advantage of the current network of existing footpaths, cycleways, and public transport services.

9.2.3 Pedestrian and cyclist routes are also identified to optimise walking and cycling opportunities and improve the permeability of the development site maximising the linkages to the neighbouring services and facilities.

9.2.4 The proposed development will be sensitively designed to see the creation of an enhanced street hierarchy that would facilitate safe routes through the site and connect with the existing footpaths, cycle routes and public transport services to maximise the site permeability and thus encourage the uptake of walking and cycling within the development.

9.2.5 Footway extension as well as new crossing facilities will also be provided along A4135 Draycott to improve the site connectivity by walking and cycling. Extension of the existing 40mph speed limit to the north of M5 overbridge is also envisaged to reflect the change on site frontage and reduce the passing vehicle speed. This is in compliance with the key measures identified within Stroud Sustainable Transport Strategy for the site.

9.2.6 In addition, improvement options by means of localised road widening and realignment or an alternative traffic management scheme are also proposed at High Street/ Neol Lee Way/ Chapel Lane Roundabout to mitigate the development traffic impact and improve the local travel environment. The proposed highway enhancements can be accommodated within the existing highway boundary.

9.3 Travel Plan

9.3.1 Travel Plans are seen by the Government as a strategic management tool in achieving traffic reduction and accelerating the development of more sustainable travel trends on both the strategic and local highway networks. Furthermore, they are being increasingly used as part of a tool kit to secure reductions in carbon emissions and contribute to the UK's target to bring all greenhouse gas emissions to net zero by 2050.

- 9.3.2 To echo the Central Government and Local Authority's aspiration and thus deliver a sustainable development, promoting a balanced and vigorous local community, and to contribute to the Government's shared priorities of reducing congestion, a Framework Travel Plan has been prepared in conjunction with the TA.
- 9.3.3 This document has been prepared in compliance with LHA's s guidance outlining key targets, responsibilities, and a range of initiatives and measures that are designed to:
- Reduce the need to travel by car, thus reducing pollution and congestion in the area, and minimising the need for parking;
 - Facilitate good access to key destinations such as retail, leisure health and education;
 - Cooperate with neighbouring communities, Local Authority, and other relevant organisations in achieving the greatest modal shift away from solo car journeys;
 - Provide all necessary on-site facilities to encourage the usage of walking, cycling and public transport as appropriate;
 - Promote a healthier lifestyle for employees, residents, visitors and the wider community.
- 9.3.4 To achieve the above objectives, a number of potential measures have been identified within the Framework Travel Plan that have been identified for the site.

10 Summary and Conclusions

10.1 Summary

- 10.1.1 This TA has assessed the accessibility of the application site and carried out a detailed study to establish the likely impact of the development and proposed mitigation measures where appropriate.
- 10.1.2 This TA has been prepared in support of a planning application being made by Robert Hitchins Limited (northern part of the site) and another by Persimmon Homes Severn Valley (remainder of the site) with two identified options for the southern part of the site. These two options relate to a 'with school' and 'without school' scenario. The TA has therefore considered the whole development with the two options as set out below:
- *Option 1 – 1,030 residential units (if the land for a school is not required)*
 - *Option 2 – 950 residential units and a 1.5 form entry school*
- 10.1.3 The scope and methodology underpinning this assessment is consistent with the transport studies submitted in support of the neighbouring Bathhurst Ltd development which was considered acceptable and robust by GCC.
- 10.1.4 Vehicular accesses to the site will be directly off the A4135 via a new built roundabout to the north and a new signal-controlled junction to the south. Both access junctions have been purposely designed in line with MfGS's standards with suitable geometric arrangement and visibility splay to serve the forecast development traffic.
- 10.1.5 As part of the proposals, it is proposed to extend the 40mph speed limit to the north of the M5 overbridge to provide an enhanced gateway into the village and create a strong sense of arrival. This will inevitably improve the travel environment for all road-users along this route.
- 10.1.6 Pedestrian and cycle connections are proposed within the site with appropriate connections also provided onto the A4135. In addition, appropriate offsite pedestrian and cycle network enhancements will be provided in the vicinity of the site access junction to enhance connectivity in this regard.
- 10.1.7 The onsite parking provision will meet the parking standards set out within the MfGS Parking Standards. In addition, suitable cycle parking will also be provided onsite.
- 10.1.8 The site is well located in relation to the local communities in Cam and benefits from a close proximity to local shopping and employment destinations along the A4135.
- 10.1.9 The site is reasonably served by a network of existing pathways and public transport provision in the area. Thus, active and sustainable modes of transport, primarily walking and cycling, offer a viable and realistic alternative to the private car for local trips. In light of this, the site is in accordance with planning policies to locate development in sustainable locations.
- 10.1.10 Junctions, that are subject to material changes in traffic volumes as result of the development, have been assessed against their operational performance for future year baseline and with development traffic scenarios.
- 10.1.11 Offsite highway enhancements by means of localised road widening and realignment or the introduction of a traffic management scheme are also proposed at High Street/ Neol Lee Way/ Chapel Lane Roundabout to mitigate the development traffic impact and improve the local travel environment.

10.1.12 The capacity assessment demonstrates that the impact of the proposed development can be accommodated within the existing and planned highway network and would not result in a severe residual cumulative impact on the operation of the network.

10.2 Conclusion

10.2.1 The site is located in suitable, accessible and sustainable location giving future residents the choice to travel by sustainable modes of travel. The proposals would see an enhancement to the local pedestrian and cycle network.

10.2.2 The proposed offsite highway enhancements will mitigate the forecast development impact. It can therefore be concluded that there are no highways or transportation reasons to prevent the proposed development from being permitted.

Appendix A: Illustrative Masterplans



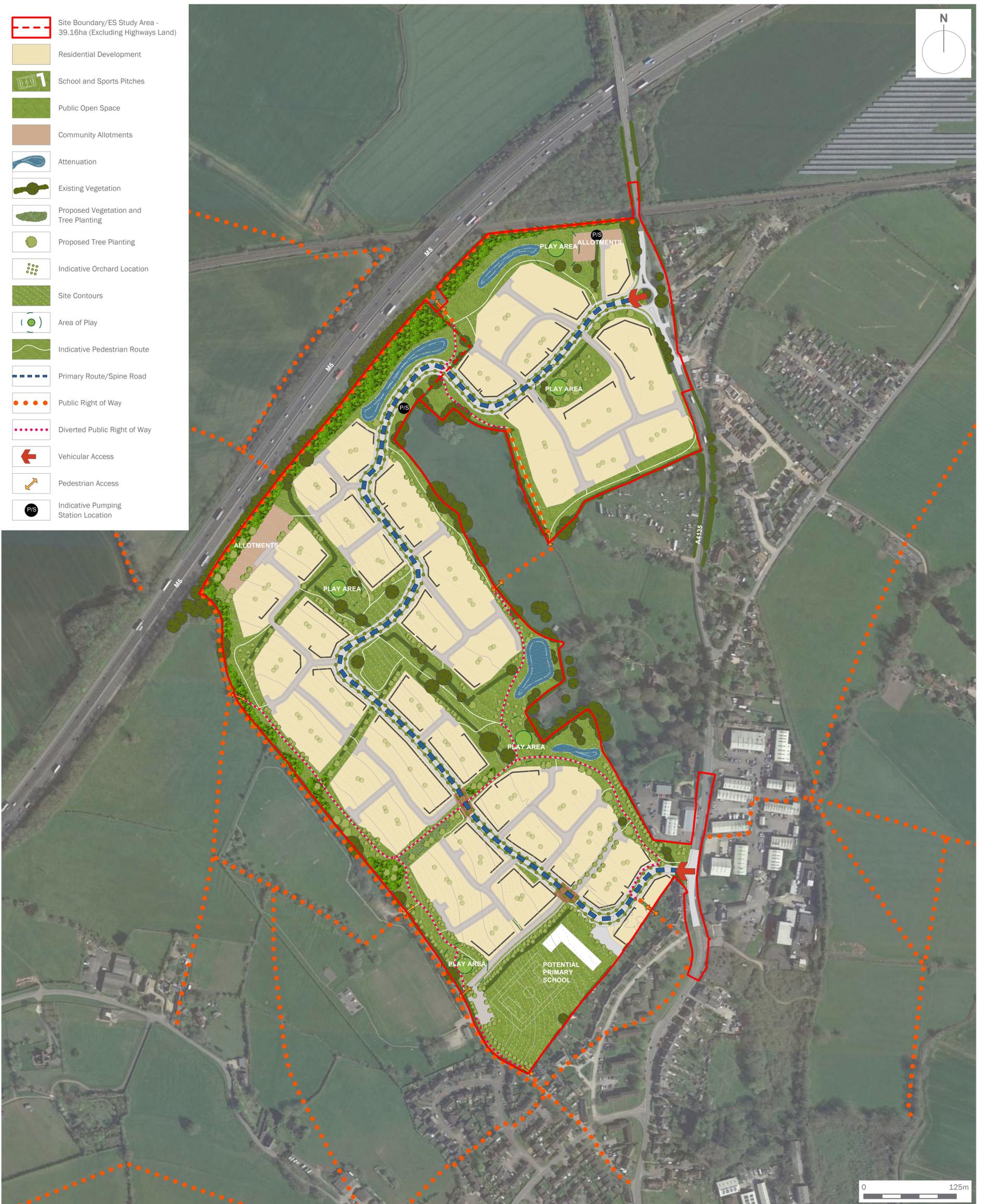
the environmental
dimension partnership

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date **08 MARCH 2021**
drawing number **edp6826_d009a**
scale **1:2500 @ A2**
drawn by **OS**
checked **GOH**
QA **PD**

client **Persimmon Homes Severn Valley**
project title **Land at Draycott, Cam**
drawing title **Illustrative Masterplan**

Land at Draycott, Cam Framework Plan



Appendix B: Scoping Submission



Title: Transport Scoping Note

Date: April 2020

1.0 Introduction

1.1 Jubb have been appointed by Persimmon Homes Severn Valley and Robert Hitchins to provide highways and transportation advice in relation to a proposed residential led mixed-use development at land west of the A4135, Cam west of Draycott. The site is included as a draft site allocation within the Stroud District Council Local Plan Review (dated November 2019) which identifies it for the location of 700 dwellings, a primary school and associated infrastructure, landscaping, and community space.

1.2 Details of the site location is set out in **Figure 1.1** below. In addition, a preliminary illustrative masterplan has also been included with this Technical Note (TN) as **Appendix A**.

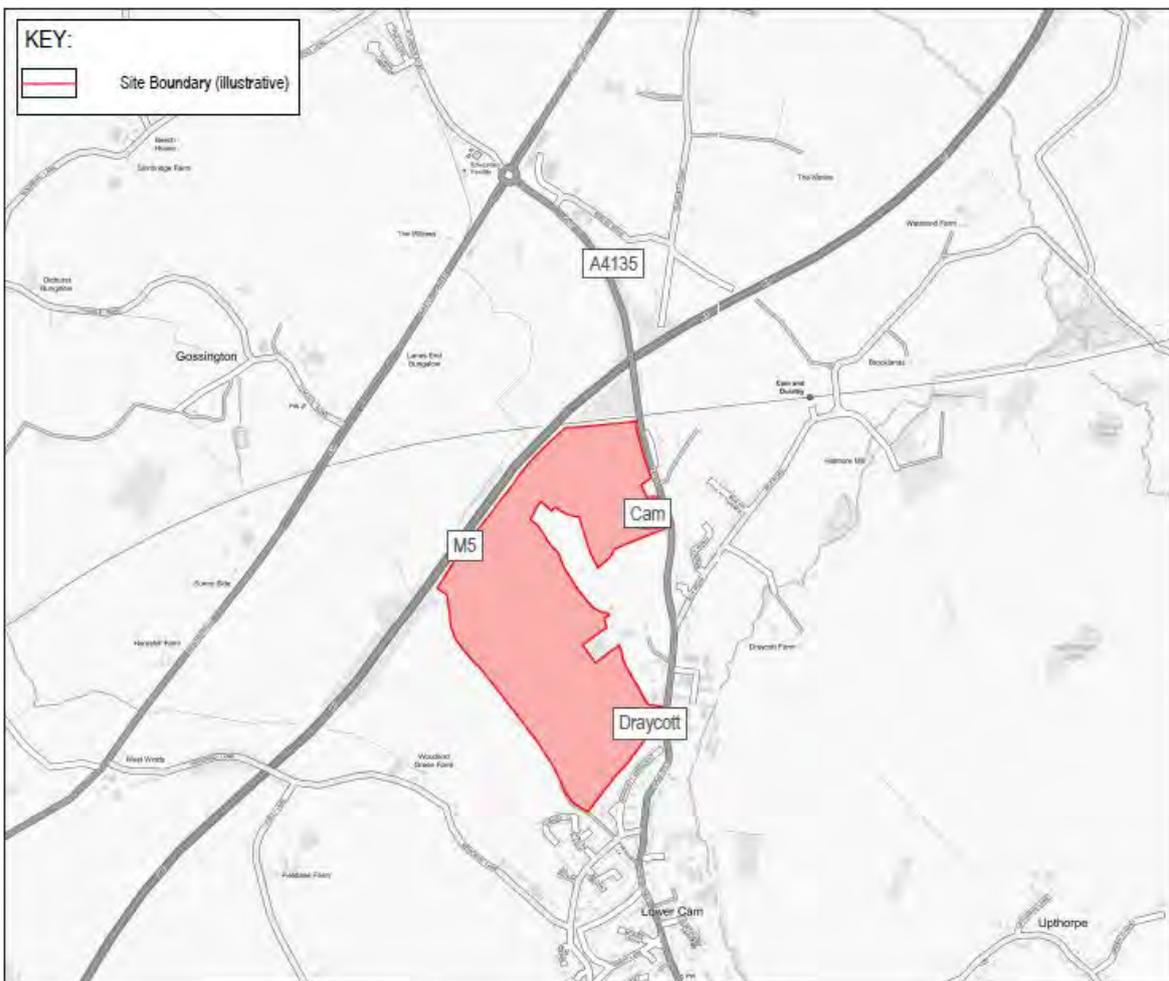


Figure 1.1 – Site Location

- 1.3 This Transport Scoping Note provides details of the proposed assessment that would be produced and submitted, within an associated Transport Assessment (TA), as supporting information for a planning application in relation to the proposals.
- 1.4 This scope of works has been developed following a detailed review of a previously produced TA by Asbri Transport for a neighbouring mixed-use proposal on land north-east of Cam known as the Bathhurst Ltd development (**ref: S.15_2804/OUT**). It is noted that the Bathhurst Ltd development received planning consent in December 2017 for the following:
- 450 dwellings;
 - 10.7 ha of employment land for use classes B1, B2 and B8;
 - Open space and landscaping including a flood storage pond and riverside park; and
 - New vehicular access to Draycott and Box Road.
- 1.5 In addition, this TN also provides a brief description of the Travel Plan (TP) which would also be submitted with the proposals.
- 1.6 The scope of the report is as follows:
- **Section 2:** Outlines the proposed development and proposed points of access;
 - **Section 3:** Outlines site accessibility and its sustainable credentials including walking routes, public transport and cycle routes;
 - **Section 4:** Provides details of traffic generation assessment that has been calculated based on comparative survey sites within the TRICS database;
 - **Section 5:** Includes details of further traffic generation refinements that have been carried out to take account of education facilities within the site and nearby local retail and employment facilities;
 - **Section 6:** Outlines details of the proposed traffic assessment scope and traffic data that would be used as the baseline for assessments;
 - **Section 7:** Reviews and takes into account the committed developments within the area that would be accounted for within the Forecast Traffic Scenarios;
 - **Section 8:** Outlines the proposed traffic distribution;
 - **Section 9:** Provides details of the parameters and methodology for further capacity assessment that will be included in the TA; and,
 - **Section 10:** Provides a brief description of the TP that would be submitted with the proposals.
- 1.7 In addition, a subsequent scope summary is provided as **Section 11**.

2.0 Proposed Development

- 2.1 The proposed scheme would see the development of an area of agricultural land to the west of the A4135 to provide up to 1,100 residential dwellings comprising of a mixture of dwelling sizes and tenures, as well as an on-site two form-entry primary school. In addition, it is also proposed that car parking associated with the school could also be used as a car park for access to Jubilee Fields (i.e. to cater for existing demand) during periods when the school is closed (i.e. at weekends and during the school holiday periods).

- 2.2 The main access to the highway network will also be obtained via the provision of two appropriate access points along the A4135. Drawing 20158_SK_001 P2 included as **Appendix B** shows a proposed Roundabout access arrangement that will connect with the A4135 at a point approximately 400m south of the M5 overpass to the north of Cam. Also attached in **Appendix B**, as drawing 20158_SK_002, is a proposed signalised junction access arrangement, which would connect with the A4135 further south at a point to the south of the existing Shell garage. In addition, swept path drawings have also been included as **Appendix B** which demonstrate that these proposed junctions can also accommodate the movements of large vehicles as appropriate.
- 2.3 It is proposed that pedestrian access into the site would be incorporated into both vehicular access junctions via a footpath on either side of the carriageway and would tie into the existing provision. A full assessment of the access junctions and pedestrian accessibility would be included within the forthcoming TA.
- 2.4 Pedestrian access is also proposed to connect with Everside Lane. It is noted that the proposals would provide alternative access to Jubilee Fields and therefore this lane would be used by less vehicles with the proposals in place, and would therefore form a more appropriate route for pedestrians and cyclists.
- 2.5 Whilst it is evident that the development would result in additional traffic generation that would increase traffic flows in this area of Cam, the educational land use phase of the development would likely retain a number of trips within the site. As such, this would reduce the subsequent offsite impact. The effects of this "internalisation" are discussed in further detail in **Section 5** of this TN.

3.0 Site Accessibility

Walking Distance

- 3.1 The proposed site is well-related to a range of existing and forthcoming facilities and services in Cam via an extensive footway network that radiates throughout the village. **Figure 3.1** below provides a non-exhaustive overview of the range of facilities and services in the area that can be reached within a reasonable walking distance from the main access (i.e. 2km).

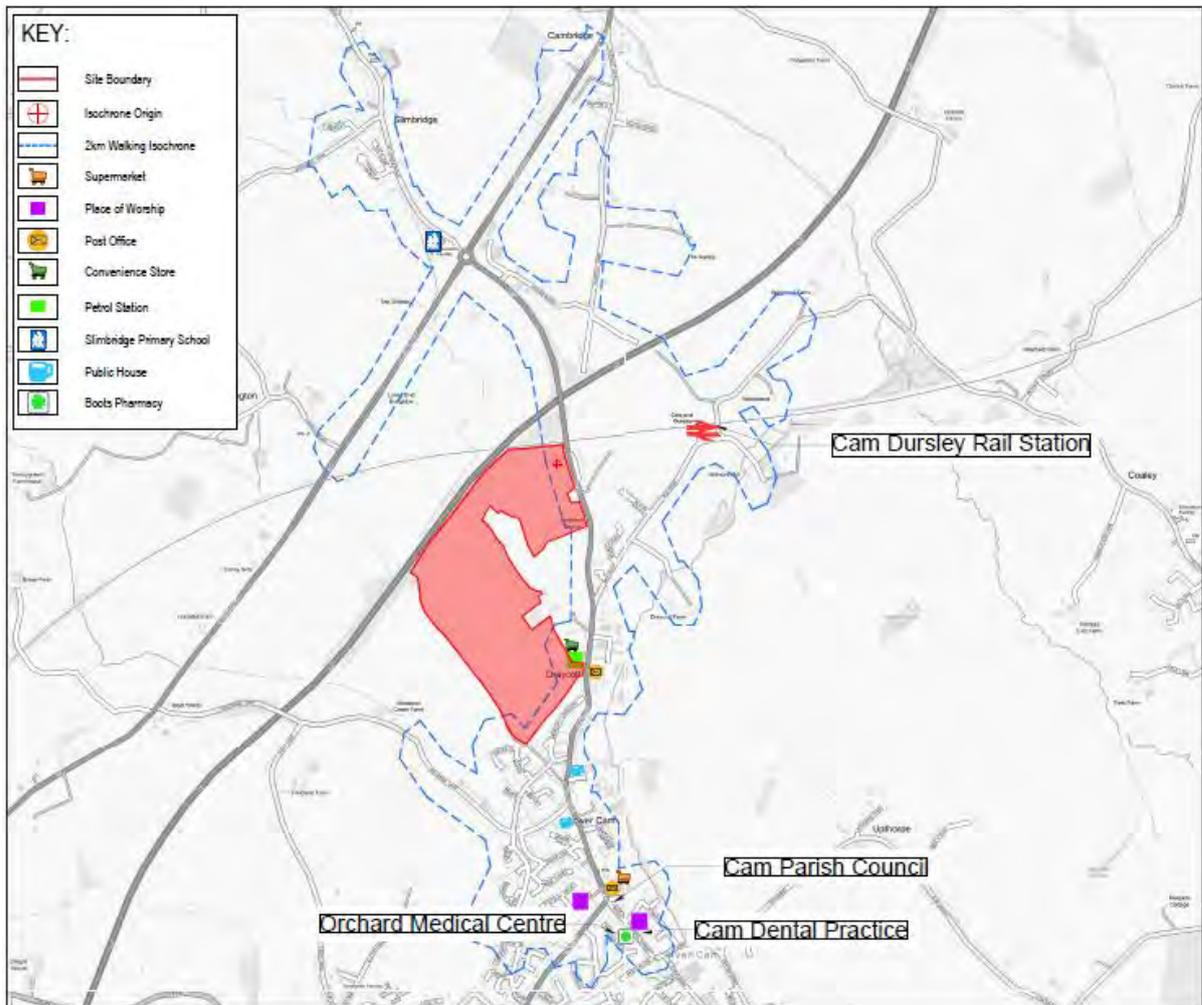


Figure 3.1 – Site Accessibility (distances measured from Main Access)

- 3.2 Importantly, it is noted that the neighbouring Bathurst Ltd development will provide further facilities such as employment areas, thus increasing the availability of services well-related to the site. As such, the proposed site is well-related to a range of existing and forthcoming facilities and services.
- 3.3 Furthermore, a range of Public Right of Way's (PROWs) and bridleways permeate throughout Cam and also run throughout the site. These PROWs are shown in **Figure 3.2** below.

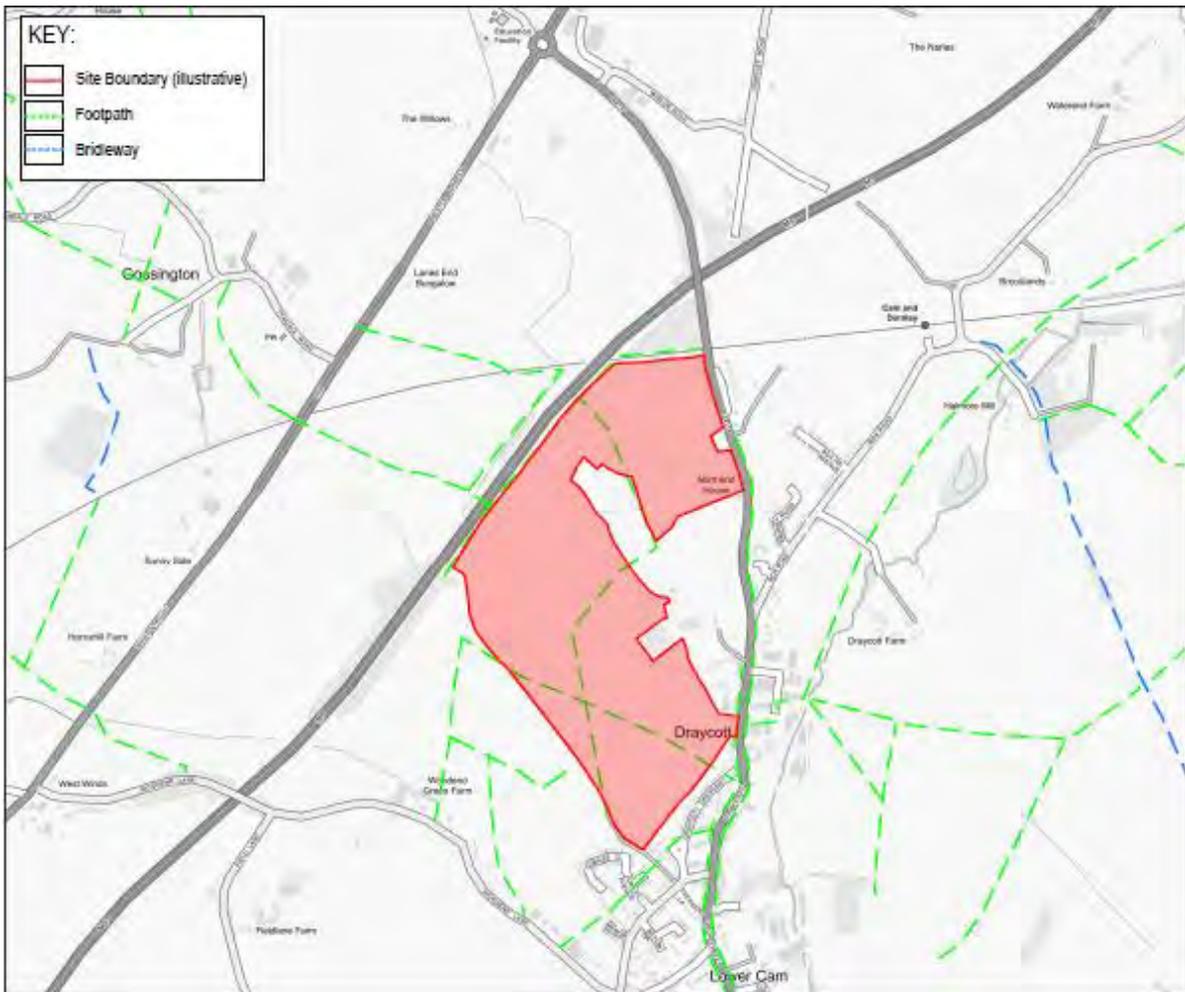


Figure 3.2 – PRoW in Cam

Cycling Distance

- 3.4 A much larger surrounding area can be reached within reasonable cycling distance of 5km, including a much larger area of Cam, as well as Dursley which offers a wider range of facilities and services. As such, it should be considered that residents of the proposals will not need to rely on the use of the private car for day-to-day trips to these destinations. **Figure 3.3** below shows the 5km cycle distance from the site.

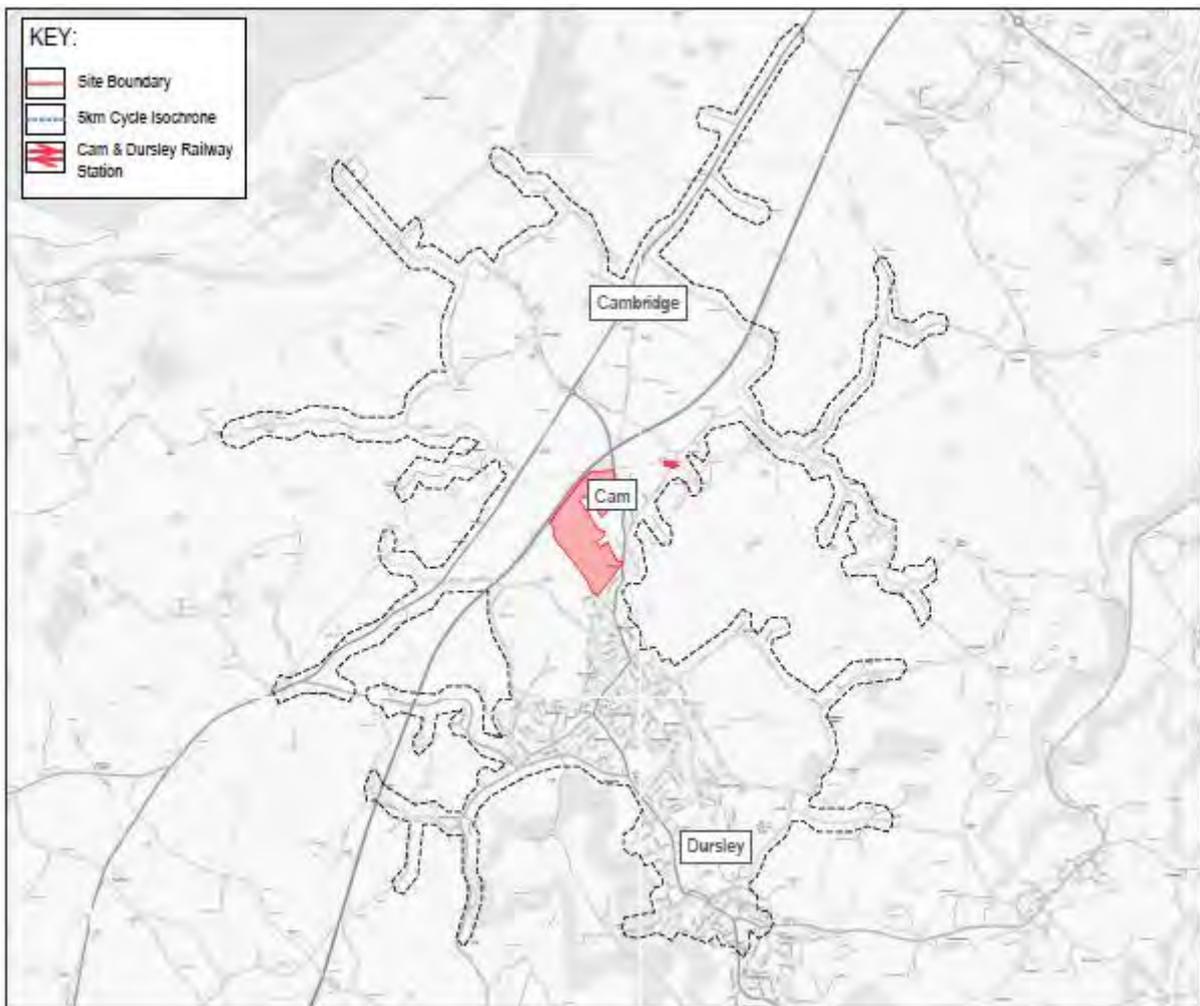


Figure 3.3 – 5km Cycle Isochrone (Distances measured from Main Access)

Public Transport Accessibility – Bus

- 3.5 The site is located near to the routes of existing bus services along the A4135 that provide services through to Gloucester, Bristol, Stroud and Dursley. As a result, there is an opportunity to encourage the use of existing bus services for day-to-day journeys to and from the site. These bus stops and services are shown on **Figure 3.4** below.

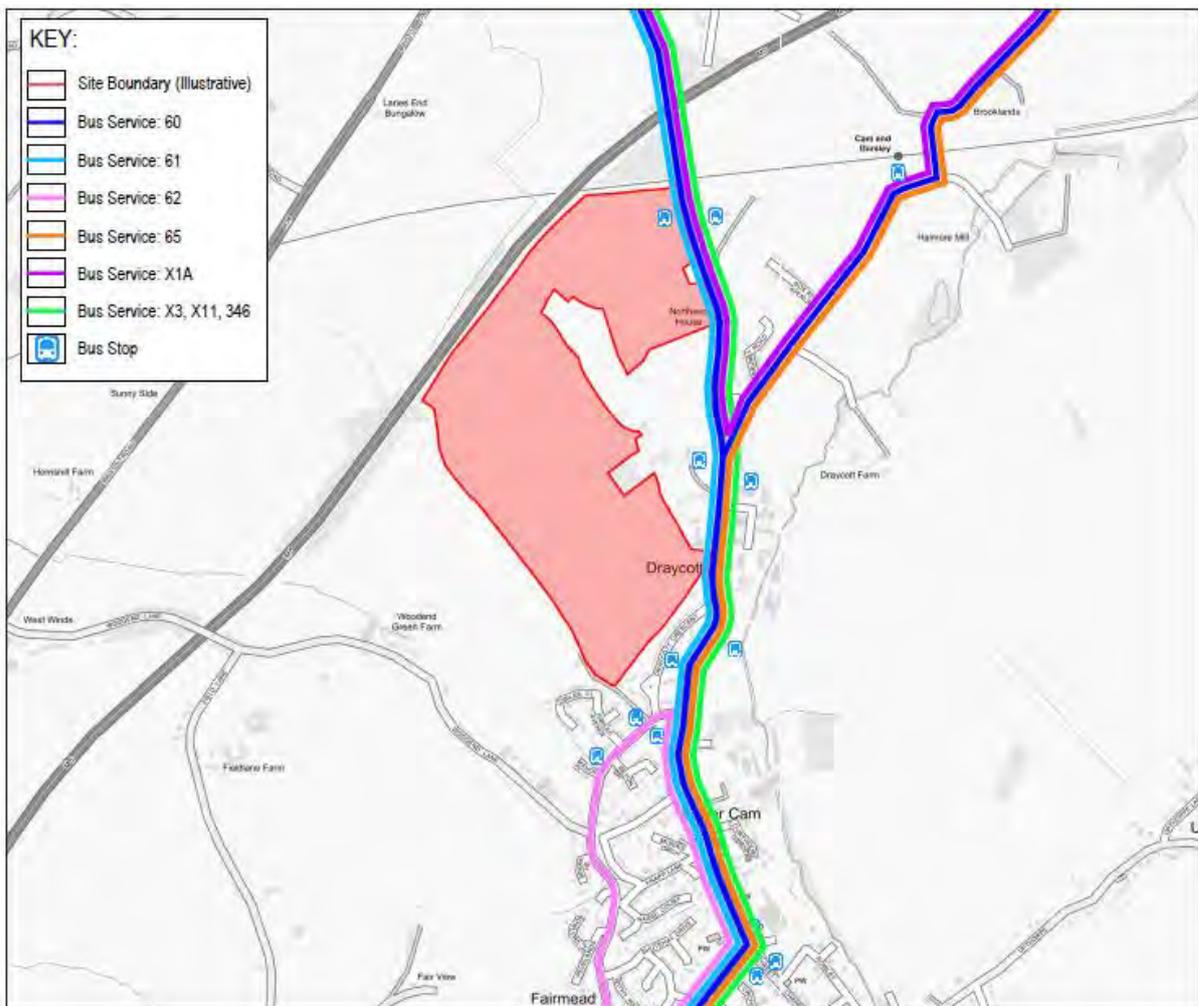


Figure 3.4 – Bus Stop Location and Services

Public Transport Accessibility – Rail

- 3.6 Cam & Dursley rail station is located to the north east of the site, within approximately 1.3km walking distance from the main northern access and 1km from the southern access, equating to a walk time of approximately 16 minutes and 12 minutes respectively. It is also noted that there are existing footway links that provide a connection between the points of access and the station.
- 3.7 Alternatively, the station can also be accessed within a 6 minute cycle ride of the main northern access and 4 minutes from the proposed southern access. Furthermore, as shown in **Figure 3.4** above, the 60, X1A, and 65 bus service also provide a link with the railway station.
- 3.8 Cam & Dursley is managed by Great Western Railway (GWR) and forms a stop on the First Great Western route providing direct services to a range of destinations including Gloucester and Bristol. Gloucester can be reached via train services, running on an hourly basis, whilst Bristol can be accessed within 40 minutes and also has connecting trains running on an hourly frequency. The full GWR network is available at **Appendix C**.

Summary

- 3.9 In consideration of the sustainable transport linkages as discussed above it is evident that there is opportunity for a high proportion of trips to and from the site to be undertaken by sustainable modes of transport.

4.0 TRICS Assessment

- 4.1 As set out earlier in this note, the site is expected to see the development of up to 1,100 dwellings.
- 4.2 As per standard industry practice, to predict the trip generation associated with the Residential development, TRICS database (version 7.5.1) has been used to calculate the trip rate for the development based on comparative sites.

Residential Traffic Generation

- 4.3 The peak hour vehicle trip rates of the proposals have been calculated for Private Housing (i.e. using comparative survey sites within the Housing Privately Owned TRICS category). **Table 4.1** below provides a summary of the peak hour trip rates with the resultant trip generation for 1,100 units outlined in **Table 4.2** below.
- 4.4 Full TRICS output is provided as **Appendix D** of the TN.

Residential Category	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
	Arrivals	Departures	Total	Arrivals	Departures	Total
Private Housing	0.134	0.371	0.505	0.338	0.161	0.499

Table 4.1 – Vehicle Trip Rates per Unit (Residential Development)

Residential Category	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
	Arrivals	Departures	Total	Arrivals	Departures	Total
Private Housing (1,100 dwellings)	147	408	556	372	177	549

Table 4.2 – Vehicle Generation (Residential Development)

5.0 Calculation of Vehicle Trip Adjustments

- 5.1 It is noted that the provision of education within the proposals would serve to retain a number of journeys within the site. Furthermore, the development is also located directly adjacent to a large area of employment (i.e. Draycott Business Park) and is also located adjacent to a local shop (SPAR) to the east of the site boundary. These journeys would be retained within the area of the site and would most likely be undertaken on foot.
- 5.2 This therefore impacts the traffic flow on the external wider network, which would therefore be less than the total vehicular trip generation figures shown in **Table 4.2**. As such, further calculations have been carried out as appropriate to take account of this. Details relating to these calculations are provided below.

Adjustment to take account of Employment Trips

- 5.3 As discussed, the proposals are located adjacent to the Draycott Business park. Thus, it is likely that a number of employment journeys would be undertaken between the site and this business park, and, given the short distance would likely be carried out on foot. This would therefore result in a subsequent reduction in vehicle journeys.
- 5.4 To forecast the total number of journeys this would account for, 2011 Census data was interrogated to ascertain the number of people likely to live and work within the same area. Thus, the internal journey to work vehicle data associated with the "Stroud 011" MSOA, which is representative of the development area, has been reviewed. The location of this MSOA is highlighted in **Figure 5.1** below.

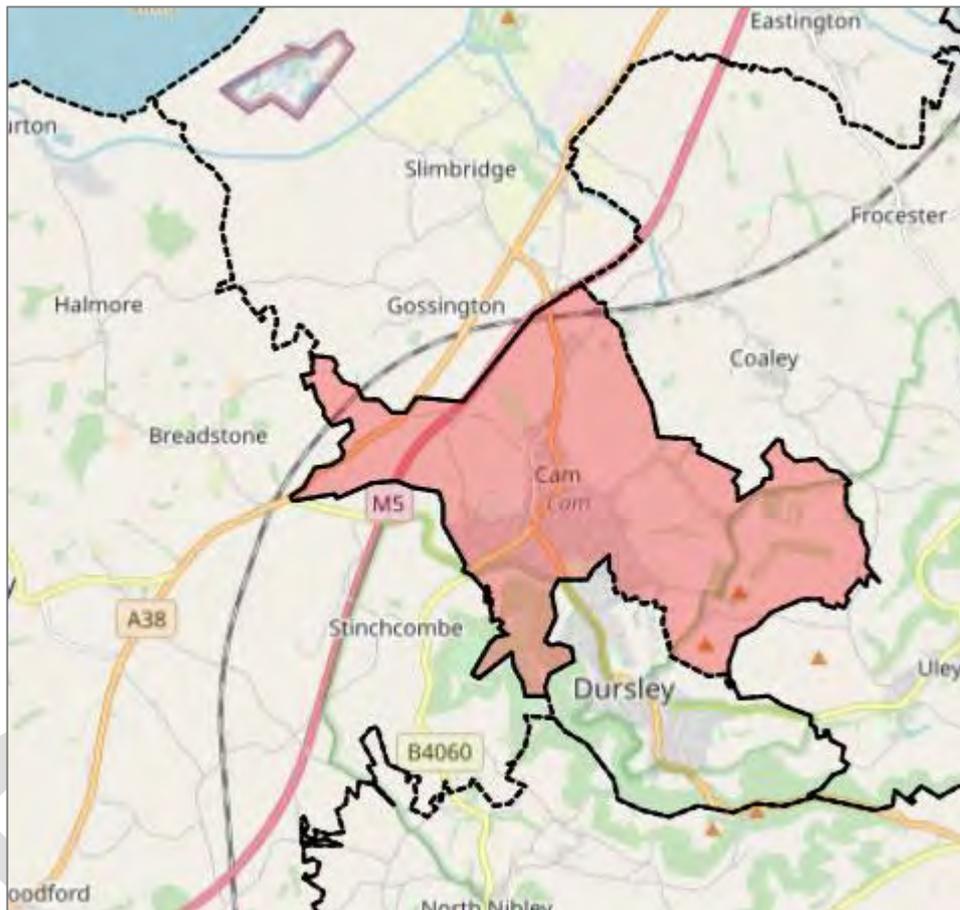


Figure 5.1 – Location of Northampton 004 MSOA.

- 5.5 This analysis demonstrates that approximately 13% of the working population within the "Stroud 011" MSOA that drive to work also work within this same area.
- 5.6 On review of the employment areas within the "Stroud 011" MSOA it is evident that Draycott Business Park would make up a significant proportion of these internal journeys within the MSOA. On this basis it is proposed that 5% reduction be applied to all vehicle journeys to and from the residential development to take account of the fact that these trips would be short in distance and therefore unlikely to be carried out by car. This reduction is summarised in **Table 5.1** below.

	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
	Arrivals	Departures	Total	Arrivals	Departures	Total
Employment Reduction	-7	-20	-27	-18	-9	-27

Table 5.1 – Vehicle reductions to take into account internal Employment journeys

Adjustment to take account of Convenience Shopping Trips

- 5.7 As discussed above a local petrol station convenience store (i.e. SPAR) is located adjacent to the eastern boundary of the site. It is therefore expected that the local store would account for a number of AM and PM convenient shopping trips. Thus, to calculate the potential internalisation, associated information has been gathered by the 2018 National Travel Survey (NTS); the latest available series of household data which provides a data source at national level on personal travel in England.
- 5.8 NTS Table 502 of the NTS provides details of the “Trip start time by trip purpose (Monday to Friday only)” and sub-tables which split the trips into specific modes. A peak hour summary of data for car/van driver is provided as **Table 5.2** below. In addition, full details of these NTS figures have been included as **Appendix E** of this TN.

Journey Purpose	AM Peak (08:00-09:00)	PM Peak (17:00-18:00)
Commuting	31%	39%
Business	7%	5%
Education	1%	0%
Escort Education	28%	3%
Shopping	5%	13%
Personal business	23%	23%
Visiting Friends / Sport / Entertainment	4%	15%
Holiday / Day Trip	2%	2%

Table 5.2 – Summary of Peak Hour Journey Purpose – As Extracted from NTS Table 0502

- 5.9 It can be seen from **Table 5.2** that shopping comprises a proportion of the main journey purpose during the reviewed peak hours, equating to 5% in the AM peak and 13% within the PM.
- 5.10 Retail trips in the morning peak are likely to consist of more convenience based journeys (e.g. to pick up day to day food products) and therefore it is likely that the nearby local centre would account for the most part all of the shopping journeys (i.e. the full 5% as outlined within the NTS). However, evening journeys would most likely encompass a broader range of shopping journeys which means that lower proportion of all shopping journeys would be convenience based in this peak (i.e. lower than the 13% as identified with the NTS). On this basis it is considered reasonable and robust to assume a 5% reduction be applied to vehicle journeys in both peaks to take account of the fact that convenience journeys would not require a significant journey and would therefore be more likely to be carried out on foot rather than by car. This reduction is summarised in **Table 5.3** below.

	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
	Arrivals	Departures	Total	Arrivals	Departures	Total
Shopping Reduction	-7	-20	-27	-18	-9	-27

Table 5.3 – Vehicle reductions to account for nearby convenience trips

Internalisation of Education Trips

- 5.11 As discussed above the proposals will include a primary school to serve the educational needs of the proposed residents. Thus, it is evident that this will further reduce the requirement to travel outside of the site by private car.
- 5.12 A trip attraction calculation has been undertaken of the 2-form entry primary school to ascertain the level of internalisation that would be derived from this use. Trip rates have therefore been calculated based on comparative Primary School survey sites within the TRICS database. The resultant trip rates are summarised in **Table 5.4** below with full TRICS output also provided as **Appendix F**. In addition, **Table 5.4** also provides details of the total forecast traffic attraction for the proposed Primary School, which, it is assumed, would provide education for 420 pupils.

	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
	Arrivals	Departures	Total	Arrivals	Departures	Total
Trip Rate (per pupil)	0.314	0.230	0.544	0.021	0.034	0.055
Trip Generation (420 pupils)	132	97	228	9	14	23

Table 5.4 – Vehicle Traffic Attraction (Proposed Primary School)

- 5.13 It is noted that the vehicle trips associated with the Primary School would predominantly consist of parent drop off and pickup trips. Evidently some of these trips would be linked with other journeys, most likely journeys to work, and therefore not all of the trips outlined within **Table 5.4** would be retained within the site.
- 5.14 Notwithstanding this, guidance outlined within the "Travel during the morning peak" section of the National Travel Survey factsheet titled "Trip Chaining: 2002-2014" (included as **Appendix G** of this TN), indicates that some 75% of primary school journeys are not linked with a journey to work trip. On this basis it is assumed that 75% of the journeys shown in **Table 5.4** would be retained within the site and can therefore accordingly be removed from the total traffic generation calculated for the residential development.
- 5.15 On this basis, as shown in **Table 5.5** below, the Primary School vehicle trip attraction figures shown in **Table 5.4** have been reduced by 25% to calculate the proportion of these school journeys that would be retained within the site. The subsequent reciprocal and opposing reduction that would be applied to the residential trips to take account of this internalisation are also shown in **Table 5.6**.

AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
Arrivals	Departures	Total	Arrivals	Departures	Total
99	72	171	7	11	17

Table 5.5 – Calculation of Total Primary School Trips Retained Within Site

AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
Arrivals	Departures	Total	Arrivals	Departures	Total
-72	-99	-171	-11	-7	-17

Table 5.6 – Reduction Applied to Residential Trips to Account for Internalised Primary School Trips

Summary

5.16 The total calculation reductions set out in **Table 5.1** (i.e. Employment Adjustment), **Table 5.3** (i.e. Convenience Shopping Adjustment) and **Table 5.6** (i.e. Education Adjustment) have been subtracted from the total residential trip generation in **Table 4.2**. The resultant figures summarised in **Table 5.7** below represent the total forecast traffic volume on the external highway network.

	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
	Arrivals	Departures	Total	Arrivals	Departures	Total
Residential Trip Generation	60	268	329	324	153	477

Table 5.7 – Forecast Traffic Volume onto External Highway Network

6.0 Scope of Traffic Assessment

6.1 The scope of traffic assessment is based on that originally undertaken for the Bathurst Ltd mixed-used development proposals and as set out with the associated TA submitted as supporting information for this consented development. Thus, it is proposed that the scope of assessment would encompass the following junctions:

- Site Access junctions;
- The A38 Bristol Road/A4135/St Johns Road roundabout junction;
- The A38 / B4066 Berkeley Road priority junction;
- Taits Hill Road / Dursley Road / The Avenue priority junction;
- Woodfield Road / Tilsdown / A4135 Cam pitch mini-roundabout;
- A4135 Bull Pitch / B4066 / Woodmancote roundabout;
- Cam Pitch / A4135 High Street / Chapel Street / Noel Lee Way mini-roundabout junction;
- A4135 / Box Road / Draycott priority junction; and
- Tilsdown / Dursley / Kingshill Road mini-roundabout.

6.2 On this basis baseline traffic flows will be extracted from Figure 3.3 titled “2015 Baseline (surveyed) flows” of the Bathurst Ltd TA. These flows, which are based on surveys understood to have been carried out on Thursday 21st May 2015, are included as **Appendix H** of this TN.

- 6.3 A review of the Department for Transport web site has identified that the most complete and up to date count point in the vicinity of the site that includes true count data (i.e. not estimates as shown at some sites) for the years between 2015 and 2018 is site 947129. This count point is located on the B4060 The Avenue road just south of Stinchcombe Village Hall on part of the assessed network considered within the Bathurst TA (i.e. on approach to the Tait's Hill Road / Dursley Road / The Avenue priority junction).
- 6.4 The traffic levels recorded at site 947129, which are summarised in **Table 6.1** below, show a decrease in traffic levels between 2015 and 2018, with 2015 also shown as the second highest recorded level since 2009. Thus, it is evident that there is no recorded recent uplift in traffic flow in the local area since the counts were undertaken as supporting information for the Bathurst TA and therefore these counts would provide an appropriate representation of current traffic levels.

Year	Annual Average Daily Flow
2009	3502
2010	3713
2011	3643
2012	3697
2013	3641
2014	3572
2015	3838
2016	3551
2017	4292
2018	3565

Table 6.1 – Manual Counts as Recorded at DfT traffic count point 947129

- 6.5 As discussed later in this scoping note it is forecast that strategic network traffic impact at junctions 13 and 14 of the M5 would be at a low level. Thus, it is not considered appropriate to carry out further assessment of these junctions.

7.0 Forecast Traffic

- 7.1 It will be assumed in the forecast traffic assessments that committed developments would be in place and incorporated into the background growth. **Figure 7.1** provides an illustration of the location of neighbouring committed developments.

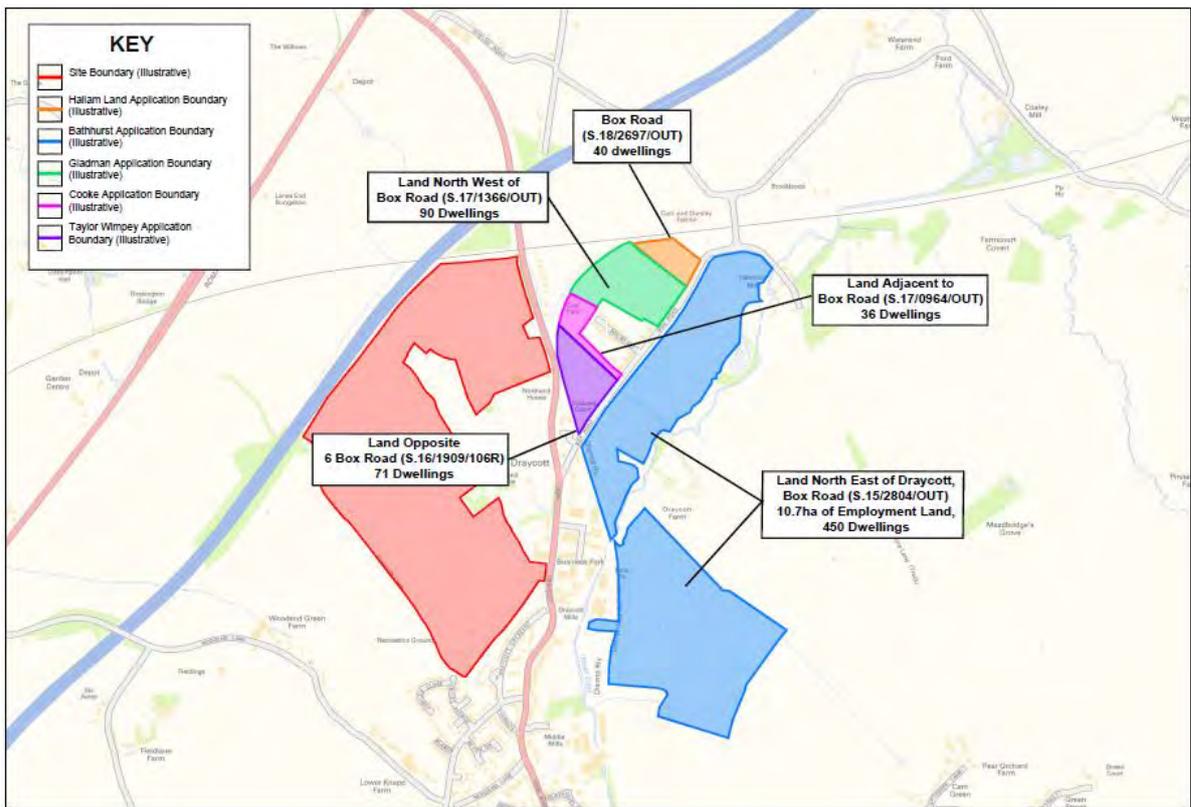


Figure 7.1 – Committed Developments Location

7.2 The planning references for committed developments in the area are listed below:

- S.18/2697/OUT
- S.17/1366/OUT
- S.17/0964/OUT
- S.16/1909/106R
- S.15/2804/OUT

7.3 Traffic flow for these developments will therefore be extracted from the subsequent transport reports as submitted for each proposal and will be included for in the forecast base flows.

7.4 It is considered that these developments would provide the majority of traffic growth within the local area since 2015 and for future years. As such, the application of further growth, for example using factors as extracted from Temprow, is neither considered necessary nor appropriate.

8.0 Traffic Distribution

8.1 It is proposed that traffic distribution be based on that already agreed with GCC for the neighbouring Bathhurst Ltd development (ref: S.15/2804/OUT) and set out in the subsequent TA. This distribution is based on calculations using 2011 journey to work census data which is summarised within Appendix I of the neighbouring Bathhurst Ltd development TA with subsequent turning movements set out as Figure 2.1 of this TA. The census breakdown tables and subsequent percentage turning movements have been extracted from the neighbouring Bathhurst Ltd development TA and are included within **Appendix I** of this scoping note as a point of subsequent reference.

- 8.2 It is noted that this previously agreed distribution does not extend to the M5 network with the most northernmost point extending to “Zone A” on the A38 just north of the A4135 junction and the most southerly point shown at “Zone G” on the A38 just south of Berkely Road. Jubb have reviewed and extended this distribution (i.e. as set out in **Appendix I**) and have calculated that only 8% of development traffic would likely travel via the M5 using Junction 13 to the north and only 8% of development traffic would likely travel via the M5 using Junction 14 to the south. A summary of this calculation is provided as **Appendix J** of this scoping note.
- 8.3 The resultant calculated vehicle trips forecast to use each Motorway junction to access the M5 are set out below in **Table 8.1**. In comparison to the flows during the peak hours on the M5 between junction 13 and 14, which, as demonstrated in the traffic flows as extracted from the Highways England TRADS web site, as summarised as **Appendix K**, are typically in the region of 3,000 vehicles in either direction, these low traffic figures are unlikely to create significant impact. Thus, further assessment of the trunk road network is not considered to be required.

	AM Peak (08:00-09:00)			PM Peak (17:00-18:00)		
	Arrivals	Departures	Total	Arrivals	Departures	Total
Junction 13 (North)	5	21	26	26	12	38
Junction 14 (South)	5	21	26	26	12	38

Table 8.1 – Forecast Traffic Volume Accessing M5

9.0 Further Capacity Assessments

- 9.1 The traffic impact of the proposals will be compared with the traffic flows associated with the baseline flows of the forecast year (i.e. encompassing observed survey traffic movements and traffic movements from associated committed developments). Where development traffic flows are shown to exhibit an impact of above 10% at any junction (i.e. above that which would be already experienced in typical daily variation) then further capacity assessment would be considered, although this would also be dependent on the overall impact in terms of total flow and likely impact at the junction.
- 9.2 Where the requirement for further capacity assessment is identified this would be undertaken using industry standard modelling software (i.e. Junctions 8 or Linsig v3) for the AM and PM peak hour and for the following traffic scenarios:
- 2015 Observed
 - Future Year without Development (i.e. Observed Flows + Committed Development Traffic)
 - Future Year with Development (i.e. Observed Flows + Committed Development Traffic + Development Traffic)
- 9.3 Where the requirement for junction mitigation is identified this will be set out within the forthcoming TA.

10.0 Travel Plan

- 10.1 A TP will be provided that will set out measures to encourage travel by sustainable modes of transport. This Travel Plan will be developed in consideration of the guidance as set out within the GCC document titled ‘Travel Plan Guide for Developers’ dated July 2011.

11.0 Summary

- 11.1 It is evident from the above that appropriate access for the proposals can be obtained and that the proposals are located in a location that has a high potential for a significant number of trips by sustainable modes which will be encouraged through the design of the proposals and through measures identified within the TP. A TA scope is also set out above, which, once agreed with GCC, will provide a robust assessment of the transport impact of the development proposals and would therefore provide an appropriate transport submission to be included with the planning application associated with the proposals.

DRAFT

Appendix A – Illustrative Site Location Masterplan

DRAFT

-  Residential
-  Open Space
-  Infrastructure Highway
-  Secondary Street
-  Balancing Pond
-  Street Trees
-  Focal Buildings

Proposed car park and access to benefit proposed Parkland and Jubilee Fields

Proposed Parkland located highest point of development and adjacent to existing Jubilee Fields

Dwellings to aspect onto the Parkland

Linear open space connects with proposed park

Proposed noise mitigation to M5

Formal Central Square

Proposed development to aspect onto 'linear' pos and bund to provide additional noise mitigation

Proposed School Site 2.1ha

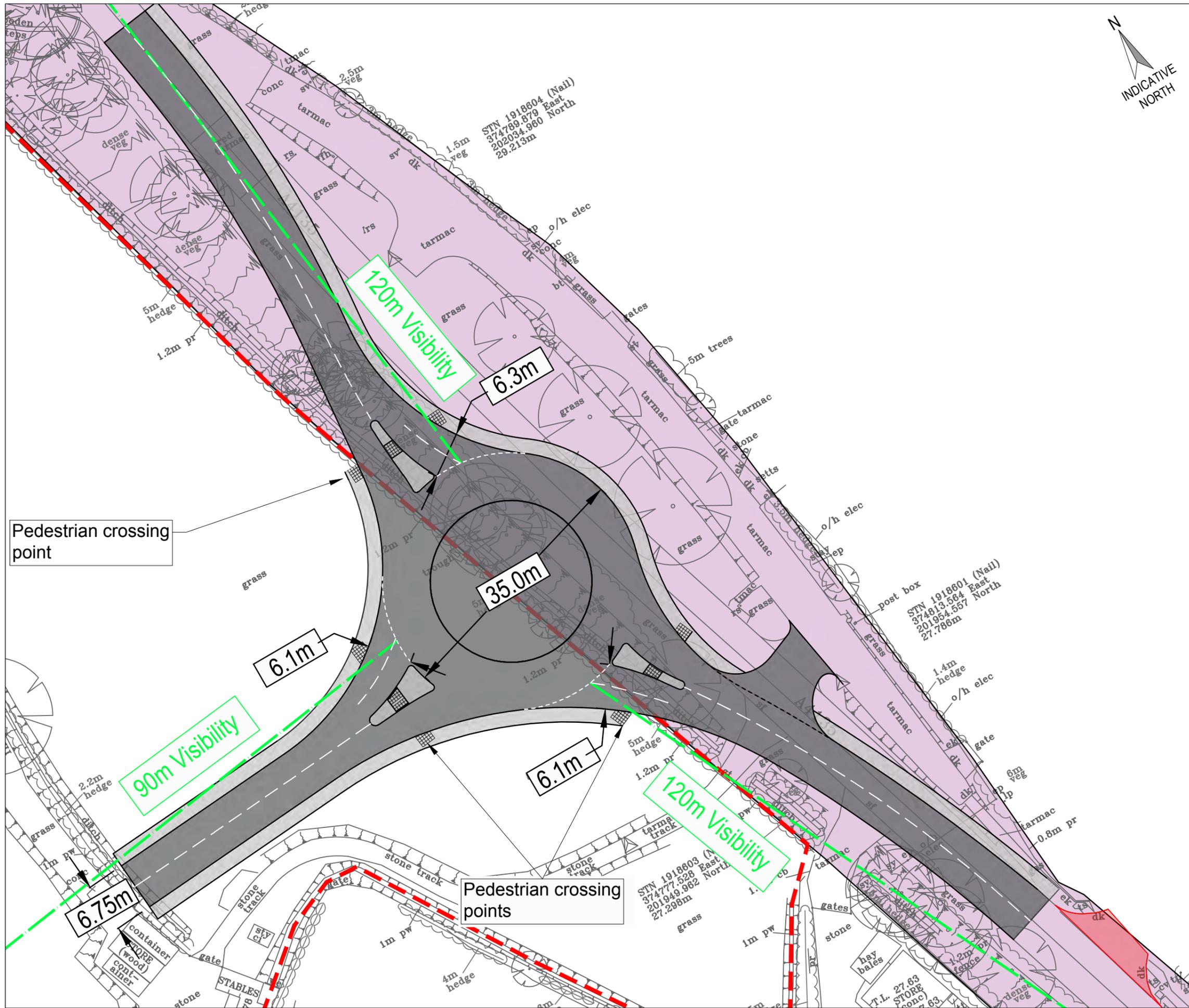
Linear Parkland

Infrastructure Highway Secondary Street Parkland Edge

Preliminary Illustrative Master Plan

Appendix B - Site Access Drawings and Swept Path Analysis

DRAFT



Key

- Proposed Footway
- Proposed Carriageway Layout
- Extent of Highways Land
- Forward Visibility
- Site Boundary (Indicative)
- 18/0044/FUL - Access to Proposed Site

Rev	Date	Description	By	Apvd
P2	30.03.20	Splitter islands modified	NP	
P1	11.03.20	Preliminary issue	NP	JD

PROJECT:
CAM WEST OF DRAYCOTT

TITLE:
NORTHERN ACCESS - PROPOSED ROUNDABOUT

CLIENT:
PERSIMMON HOMES AND ROBERT HITCHINS

SCALE@A3:
1:500

PROJECT REF:
20158
DRAWING No: 001 **REV:** P2

Revision Referencing
P = Preliminary A = Approval T = Tender C = Construction

