

## 1 INTRODUCTION

### 1.1 SCOPE

1.1.1 Velocity Transport Planning (VTP) has been appointed by Firethorn Trust (the Applicant) to provide highways and transport planning advice for an outline planning application relating to the development of up to 530 dwellings on land which forms part of the North West Bicester Eco Town development, located in Oxfordshire.

1.1.2 The Application Site falls within the administrative area of Cherwell District Council (CDC) and within the authority of Oxfordshire County Council (OCC) who are the local highway authority.

1.1.3 The Proposed Firethorn Development description for the outline planning application, planning reference: 21/01630/OUT, is as follows:

*“Outline planning application for residential development (within Use Class C3), open space provision, access, drainage and all associated works and operations including but not limited to demolition, earthworks, and engineering operations, with the details of appearance, landscaping, layout and scale reserved for later determination.”*

### 1.2 OCC CONSULTATION RESPONSE

1.2.1 An OCC consultation response to the outline planning application and Transport Assessment (TA) produced by VTP was received on 6<sup>th</sup> July 2021.

1.2.2 The OCC consultation response requested further information to be provided on several transport aspects across the application. A summary of the OCC consultation response is provided below:

- OCC requested further clarity on the proposed access points to the site and connectivity to the adjacent parcels of land;
- OCC noted issues regarding construction access and visibility that required further clarification;
- OCC requested further information be provided on the impacts of construction traffic within the Environmental Statement;
- OCC noted inaccuracies regarding sustainable transport accessibility that required amending; and
- OCC requested further information be provided to identify the suitability of the existing Elmsbrook Spine Road to accommodate additional traffic and any mitigation measures that may be required.

1.2.3 A comprehensive response to the wider OCC comments is currently being prepared by VTP to respond to the points raised. This Technical Note (TN) has been prepared to address the OCC comments in relation to the suitability of the existing Elmsbrook Spine Road.

1.2.4 For completeness, the OCC comment on the Elmsbrook Spine Road (referred to hereafter as the ‘Spine Road’) is replicated below:



*“The TA does not assess the impact of development traffic on the Elmsbrook spine road. Local objectors have highlighted the congestion experienced currently, particularly at school start and finish times. The roads have been designed with tight geometry and narrowings to slow traffic down, with one long narrowing only 4.1m wide, north of the school. It is debatable whether the road was designed with the eastern parcel in mind, since the NW Bicester masterplan shows no dwellings on this site. Safety issues due to lack of formal crossing points have also been highlighted, and the applicant has offered a contribution towards a zebra crossing. Further work should be carried out by the applicant to assess the suitability of the link for the development traffic and NMUs, and this may result in further mitigation being required.”*

### 1.3 REPORT STRUCTURE

1.3.1 Following this introduction, this TN is structured as follows:

- ⦿ **Section 2** – Background of the Spine Road;
- ⦿ **Section 3** – Methodology and Cumulative Impact;
- ⦿ **Section 4** – Spine Road Suitability; and
- ⦿ **Section 5** – Conclusions.



## 2 BACKGROUND OF THE SPINE ROAD

### 2.1 THE ELMSBROOK SPINE ROAD

2.1.1 The Spine Road is identified as being the existing single carriageway road from the priority junction of the B4100 with Braeburn Avenue to the north of the Elmsbrook development, through the existing Elmsbrook development, to the priority junction of the B4100 with Charlotte Avenue to the south east of the Elmsbrook development.

2.1.2 The Elmsbrook development, also known as the Exemplar scheme, secured planning permission on the 10<sup>th</sup> of July 2012 (Planning Ref 10/01780/HYBRID) for the following:

*“Development of Exemplar phase of NW Bicester Eco Town to secure full planning permission for 393 residential units and an energy centre (up to 400 square metres), means of access, car parking, landscape, amenity space and service infrastructure and outline permission for a nursery of up to 350 square metres (use class D2), a community centre of up to 350 square metres (sui generis), 3 retail units of up to 770 square metres (including but not exclusively a convenience store, a post office and a pharmacy (use class A1)), an Eco-Business Centre of up to 1,800 square metres (use class B1), office accommodation of up to 1,100 square metres (use class B1), an Eco-Pub of up to 190 square metres (use class A4), and a primary school site measuring up to 1.34 hectares with access and layout to be determined.”*

2.1.3 Condition 60 of the permitted Elmsbrook development related to the extent of adoptable highways within the Elmsbrook development and stated as follows:

*“Prior to the commencement of a phase, identified in condition 2 and notwithstanding the details shown on drawing nos. 7154 -UA001881-3 & 7155- UA001881-3 a revised plan of adoptable highways including vision splays shall be submitted to and approved in writing prior to the commencement of development of that phase. The roads, lanes and community streets shall thereafter be constructed in accordance with the proposed details.*

*Reason: To ensure an adequate construction and maintenance of roads, lanes and Community Streets in accordance with TRI of the Cherwell Local Plan.”*

2.1.4 Condition 60 of the Elmsbrook development has been discharged through a series of consents related to Planning Application 15/00535/DISC and whilst a Section 38 Agreement has been entered into for the Spine Road, it is understood that the Spine Road has yet to be adopted by OCC. As such, the Spine Road is currently a private road within the control of the Elmsbrook Applicant, identified as being A2Dominion Developments Ltd.

2.1.5 The following Drawings prepared by Hyder Consulting present the General Arrangement of the Spine Road, the full versions of which are included in **ATTACHMENT 1** of this TN:

- ⊙ 7234/UA001881/11 - Spine Road (S38) General Arrangement Sheet 1 of 4
- ⊙ 7239/UA001881/14 - Spine Road (S38) General Arrangement Sheet 2 of 4
- ⊙ 7240/UA001881/14 - Spine Road (S38) General Arrangement Sheet 3 of 4
- ⊙ 7241/UA001881/12 - Spine Road (S38) General Arrangement Sheet 4 of 4



## 2.2 THE NORTH WEST BICESTER DEVELOPMENT

2.2.1 The 530 units being applied for by the Applicant are included within the NW Bicester Masterplan. Cherwell District Council (CDC) adopted the NW Bicester SPD in February 2016, which is identified as delivering the following development content:

- ⦿ Up to 6,000 “true” zero carbon homes;
- ⦿ Employment opportunities providing at least 4,600 new jobs;
- ⦿ Up to four primary schools and one secondary school;
- ⦿ Forty percent green space, half of which will be public open space;
- ⦿ Pedestrian and cycle routes;
- ⦿ New links under the railway line and to the existing town;
- ⦿ Local centres to serve the new and existing communities; and
- ⦿ Integration with existing communities.

2.2.2 The NW Bicester SPD includes a Masterplan for the overall proposals at Fig 10 of the SPD, an extract of which is set out below a **Figure 2-1** for ease of reference:

**Figure 2-1: North West Bicester Masterplan**



Figure 10: North West Bicester Masterplan – Masterplan Framework

2.2.3 It is noted that the Spine Road is included on the above SPD Masterplan and whilst not particularly clear, it is noted that the Spine Road, from its junction of the B4100 with Braeburn Avenue to a point where the existing Gagle Brook Primary School is located, is identified as being a Secondary Road including footpath/cycleway. From the Gagle Brook Primary School to the junction of the B4100 with Charlotte Avenue, the Spine Road is identified as being a Primary Road with segregated footpath/cycleway.



## 3 METHODOLOGY AND CUMULATIVE IMPACT

### 3.1 PROPOSED FIRETHORN DEVELOPMENT

- 3.1.1 Whilst it is accepted that the planning application is for up to 530 dwellings, the TA that supports the application considered a total of 550 dwellings. As such, the calculations presented within this TN that relate to the proposed Firethorn development, reference the higher figure of 550 dwellings and should therefore be considered robust.
- 3.1.2 With respect to the suitability of the Spine Road, it is proposed to undertake this assessment utilising the agreed trip generation information presented within the VTP TA that supported the planning application.
- 3.1.3 Based on principles of the NW Bicester SPD, the TA assumed that 60% of the total person trips from the area would be via sustainable modes, with private car usage making up the remaining 40% of the mode share.
- 3.1.4 It is proposed to extrapolate the mode share to determine how the remaining 60% of sustainable trips from the site would be spread across the various modes of transport. Utilising the journey to work census profile presented in Table 7-5 of the VTP TA, the proportions across the other modes have been adjusted to reflect the NW Bicester SPD mode share for car trips of 40%.
- 3.1.5 The anticipated baseline mode share and the adjusted mode share profile is presented below in **Table 3-1**.

**Table 3-1: Adjusted Modal Split**

METHOD OF TRAVEL	BASELINE MODAL SHARE	ADJUSTED MODE SHARE
Underground/Light Rail	0.1%	0.1%
Train	4.4%	9.3%
Bus/Minibus/Coach	4.3%	9.1%
Taxi	0.1%	0.2%
Motorcycle/Scooter	0.6%	1.3%
Driving a Car/Van	71.6%	40.0%
Passenger in a Car/Van	6.2%	13.1%
Bicycle	3.4%	7.2%
On Foot	9.2%	19.4%
Other	0.2%	0.3%
<b>Total</b>	<b>100%</b>	<b>100%</b>

- 3.1.6 The agreed total person trip generation, as presented in Table 7-10 of the VTP TA, has then been applied across the adjusted mode share to determine the number of trips per mode, as per the methodology utilised within the TA. The multi modal trip generation assessment for two-way trips is provided below in **Table 3-2**.



**Table 3-2: Adjusted Proposed Firethorn Development Multi Modal Trip Generation**

METHOD OF TRAVEL	ADJUSTED MODE SHARE	AM PEAK	PM PEAK	DAILY
Underground	0.1%	1	1	6
Train	9.3%	69	62	518
Bus/Minibus/Coach	9.1%	68	61	506
Taxi	0.2%	2	1	12
Motorcycle/Scooter	1.3%	9	8	71
Driving a Car/Van	40.0%	298	268	2,230
Passenger in a Car/Van	13.1%	98	88	730
Bicycle	7.2%	54	48	400
On Foot	19.4%	145	130	1,083
Other	0.3%	2	2	18
<b>Total</b>	<b>100%</b>	<b>745</b>	<b>670</b>	<b>5,574</b>

- 3.1.7 With respect to non-motorised users, it is acknowledged that with the exception of motorcycles/scooters and taxi users, all other trips may at some point be either a walking trip or a cycling trip.
- 3.1.8 To determine the total number of pedestrian trips that the development may generate, including linked pedestrian trips, it is assumed that all rail/underground trips will at some point be a pedestrian trip.
- 3.1.9 There are bus stops located within close proximity of the proposed Firethorn development and whilst residents will walk to the bus stops, they are not considered to have an impact on the critical constraint of the Spine Road, which is set out in more detail within this TN.
- 3.1.10 For rail/underground trips, it will be assumed that 50% of this total will be a pedestrian trip only, with the remainder all associated with cycle trips. This is considered as a representative assumption, as it is likely there is a comparable number of people that would cycle to the station as the number of people that would walk to the station.
- 3.1.11 Based on the assumptions above, it is estimated that approximately 24% of trips from the application site could at some point be a pedestrian trip and approximately 12% of trips from the application site could be a cycle trip. Overall, this equates to a total of 180 two-way walking trips in the AM peak and 162 two-way walking trips in the PM peak, as well as 89 two-way cycling trips in the AM peak and 80 two-way cycling trips in the PM peak.
- 3.1.12 As a robust assessment, it is assumed that all pedestrian and cycle trips that are associated with the proposed Firethorn development, including those that are linked with other sustainable modes of transport, will connect with the Spine Road at a point generally located to the south of the existing bus gate between Braeburn Avenue and Charlotte Avenue. As such, 100% of these combined trips are considered to cross the existing bridge on Charlotte Avenue located to the west of the Eco Business Centre, identified as being the critical constraint along the Spine Road and a sensible location to undertake our analysis.
- 3.1.13 The reason this bridge is considered to be a critical constraint is that not only is it constructed already, but there are footways of 2.0m width provided either side of the existing carriageway, which is identified as being generally 6.0m in width, with two road narrowing features either end of the bridge where informal crossing facilities are provided that reduce the width of the carriageway to approximately 4.1m.





## 3.2 ELMSBROOK TRIP GENERATION

- 3.2.1 Reference is also made to the consented and partially built phases of the Elmsbrook development, which will generate trips that will impact the capacity of the Spine Road in terms of vehicle trips, pedestrian trips, and cycle trips.
- 3.2.2 As a robust assessment, it will be assumed that all pedestrian and cycle trips from the Elmsbrook development will impact the Spine Road at the point where the bridge on Charlotte Avenue is located. This is considered to be a robust assessment, but sensible to ensure that no pedestrian/cycle trips associated with the consented scheme are missed. **Figure 3-1** presents an extract of this existing bridge from the S38 Adoption Plan.

**Figure 3-1: Extract of Charlotte Avenue Bridge**



- 3.2.3 It is acknowledged that additional pedestrian and cycle trips associated with the Gagle Brook Primary School from outside of the Elmsbrook development, in particular from Caversfield, currently also impact this bridge crossing along the Spine Road. However, it is expected that once the further phases of the NW Bicester Masterplan are built out, the Gagle Brook Primary School is expected to not only increase in size but should accommodate primary school children from predominantly the NW Bicester development with a reduced level of capacity for children living in Caversfield.
- 3.2.4 The Elmsbrook TA applied a 17.4% internalisation ratio to the total person trips. However, as all trips associated with the Elmsbrook development are considered to be internal anyway, i.e. will have an impact on the bridge crossing, it is not deemed appropriate to apply the internalisation factor. The total person trips have been extracted from Table 8.2 of the Elmsbrook TA, with the TA suggesting that the full scheme could generate a total of 1,018 two-way total person trips in the AM peak and 709 two-way total person trips in the PM peak.
- 3.2.5 As the TA for the Elmsbrook development did not undertake a multi modal assessment, it is proposed to split the total person trips by the adjusted proportions set out within **Table 3-1** of this TN as the travel profiles are likely to be the same. It is also noted that this assumption increases the number of sustainable trips identified for the Elmsbrook development, as the Elmsbrook TA assessed vehicle trips at generally between 50%-60%, rather than the 40% as identified within the adopted NW Bicester SPD.



3.2.6 Using the adjusted mode share, the reconfigured multi modal trip generation for the Elmsbrook development is presented in **Table 3-3**.

**Table 3-3: Adjusted Elmsbrook Development Multi Modal Trip Generation**

METHOD OF TRAVEL	ADJUSTED MODE SHARE	AM PEAK	PM PEAK	DAILY
Underground	0.1%	1	1	6
Train	9.3%	95	66	637
Bus/Minibus/Coach	9.1%	92	64	612
Taxi	0.2%	2	1	12
Motorcycle/Scooter	1.3%	13	9	92
Driving a Car/Van	40.0%	407	284	2,722
Passenger in a Car/Van	13.1%	133	93	887
Bicycle	7.2%	73	51	486
On Foot	19.4%	198	138	1,323
Other	0.3%	3	2	23
<b>Total</b>	<b>100%</b>	<b>1,018</b>	<b>709</b>	<b>6,803</b>

3.2.7 As the original TA for the Elmsbrook development did not include details of the Daily trips by mode, the AM and PM details have been factored up to Daily flows by mode based on a consistent factor to that which is identified for the proposed Firethorn development.

3.2.8 Based on the assumptions presented within this TN, it is estimated that approximately 24% of trips from the Elmsbrook development could at some point be a pedestrian trip and approximately 12% of trips from the Elmsbrook development could be a cycle trip. Overall, this equates to a total of 246 two-way walking trips in the AM peak and 172 two-way walking trips in the PM peak, as well as 121 two-way cycling trips in the AM peak and 85 two-way cycling trips in the PM peak. Again, it is acknowledged that these figures are robust as any walking and cycling trips from the occupied development to the east of the bridge crossing on Charlotte Avenue would have a limited impact on this constrained point.

3.2.9 It is acknowledged that the car driver trip generation presented in the Table above exceeds the trip generation set out within the Elmsbrook TA, which estimated a total of 303 two-way car trips in the AM peak and 239 two-way car trips in the PM peak in 2016, which would fall to 269 two-way car trips in the AM peak and 215 two-way car trips in the PM peak in 2026. The increase presented in the Table above is equivalent to a 34% and 19% increase across the respective AM and PM peak hours from the 2016 car trips, and a 51% and 32% increase from the AM and PM trips that the Elmsbrook TA estimated would be generated by the scheme in 2026.

3.2.10 It is proposed to utilise the car trips calculated using the multi modal assessment above, which accounts for the multi modal split targets set out within the NW Bicester SPD and the future aspirational targets for mode shift within OCC.

### 3.3 CUMULATIVE PEDESTRIAN AND CYCLE IMPACT

3.3.1 It is noted that in the future, once the remaining developments within the NW Bicester Masterplan come forward, in particular the adjacent development of the Hallam Land proposals, there may be additional vehicle, pedestrian and cycle trips that may route via the Spine Road, and in particular across the bridge, from the adjacent development sites. These additional trips are afforded the opportunity to access the Spine Road via the “Future Phase Link” near the Gagle Brook Primary School and as identified on the extract presented at **Figure 3-1**.





- 3.3.2 However, it is also considered that based on the layout of the NW Bicester Masterplan shown within Fig 10 of the NW Bicester SPD (**Figure 2-1** of this TN), these developments will likely introduce a number of additional pedestrian and cyclist routes which will improve permeability to the south - towards Bicester.
- 3.3.3 As travel towards the south is deemed as the primary desire line from the wider NW Bicester Masterplan, including the existing Elmsbrook development and the proposed Firethorn development, it is likely that the majority of these future pedestrian and cycle trips from other sites within the NW Bicester Masterplan will instead use these new direct routes. In addition, it is also regarded that a significant proportion of the pedestrian and cycle trips from both the proposed Firethorn development and the Elmsbrook development will divert onto these new routes – freeing up pedestrian and cycle capacity along the bridge crossing of the Spine Road. For robustness, it will therefore be assumed that no pedestrian or cycle trips from the proposed Firethorn development or the Elmsbrook development will utilise these potential future routes.
- 3.3.4 Utilising the same assumptions for both the proposed Firethorn development and the Elmsbrook development that 24% of the total person trips could at some point be a pedestrian trip, the cumulative impact on the bridge crossing of the Spine Road equates to a total of 426 two-way pedestrian trips in the AM peak, a total of 333 two-way pedestrian trips in the PM peak, and a total of 2,990 two-way pedestrian trips Daily. It is also noted that these pedestrian trips would be shared among the footways on both sides of the road, with a general assumption that this would be shared 50/50 between each side of the road.
- 3.3.5 With respect to cycling, the assessment undertaken suggests that the cumulative impact of both sites will result in a total of 210 two-way cycle trips in the AM peak, a total of 164 two-way cycle trips in the PM peak, and a total of 1,470 two-way cycle trips Daily.

## 3.4 WIDER NW BICESTER LOCAL PLAN DEVELOPMENT

- 3.4.1 Traffic flows along the full length of the Spine Road have been provided by the OCC commissioned Bicester Transport Model (BTM) for a future year of 2031 excluding the proposed Firethorn development. A manual assessment of the traffic associated with the proposed Firethorn development was undertaken utilising agreed trip rates and distribution for the proposed Firethorn development of 550 dwellings, which is slightly higher than the application figure of 530 dwellings, which ensures a robust assessment.
- 3.4.2 In order to undertake an assessment of the suitability of the Spine Road in terms of traffic flows, this TN has considered two different assessment methodologies to establish the level of traffic flows that would be associated with the permitted Elmsbrook development. Any remaining traffic flows from the future year of 2031 are therefore considered to be associated with the adjacent Local Plan developments.
- 3.4.1 The Elmsbrook development was granted planning permission on the 10<sup>th</sup> of July 2012, and it was supported by a Transport Assessment and Technical Note 2A – Exemplar Site – Trip Rates and Traffic Generations (November 2010). Table 15 of Technical Note 2a included the total person trips predicted to be generated by the Elmsbrook development split between vehicular trips and non-vehicular trips for a future year of 2016 and a 2026. **Table 3-4** summarises these total person trips for both 2016 and 2026 and the full Technical Note is included at **ATTACHMENT 2** of this TN.

**Table 3-4: Exemplar Site Vehicular and Non-Vehicular Trip Generation**

Year	AM Peak Hour (08:00-09:00)						PM Peak Hour (17:00-18:00)					
	Arrivals			Departures			Arrivals			Departures		
	Veh	Non-V	Total	Veh	Non-V	Total	Veh	Non-V	Total	Veh	Non-V	Total
2016	268	266	534	270	215	485	201	154	355	211	144	355
2026	244	290	534	241	244	485	180	175	355	190	164	355



3.4.2 Whilst Technical Note 2a provides AM and PM total person trips, it does not clarify the AADT Flows. In addition, the traffic data obtained from the BTM is also provided in peak hour flows. In order to factor this data up to obtain 24-hour AADT flows, an AM peak hour to Daily AADT factor of 9.6 was used, as per the methodology set out within the supporting Transport ES Chapter and Environmental Impact Assessments

### Assessment 1

3.4.3 The first assessment considers the vehicular trips identified directly from the figures presented at Table 15 of Technical Note 2a that supported the Elmsbrook development, but with an assumption that 70% of the total vehicular trips will utilise the Charlotte Avenue junction with the B4100 and the remaining 30% of the vehicular trips would utilise the Braeburn Avenue junction with the B4100. It is acknowledged that the existing bus gate would prevent vehicular trips between Phases 1 & 2 of the Elmsbrook development to the south of the bus gate, from accessing Phases 3 & 4 of the Elmsbrook development to the north of the bus gate.

3.4.4 Assuming that the future year assessment of 2026 is likely to be the future scenario for assessment against the 2031 traffic flows from the BTM, the 2016 assessment will not be considered.

3.4.5 By deducting the vehicular flows agreed for the 2026 Elmsbrook development from the 2031 BTM traffic flows, the remaining traffic is assumed to be associated with the adjacent Local Plan developments.

3.4.6 The traffic associated with the proposed Firethorn development can manually be added to the 2031 BTM flows to establish the increase in traffic associated with the development being applied for.

3.4.7 **Table 3-5** summarises these flows for the full Spine Road by separating these to consider Braeburn Avenue and Charlotte Avenue.

**Table 3-5: Assessment 1 - Traffic Data Link Assessment**

SCENARIO	BRAEBURN AVENUE (LINK 16)		CHARLOTTE AVENUE (LINK 17)	
	AM PEAK	AADT	AM PEAK	AADT
Base 2031 (from the BTM)	173	1,661	525	5,040
Elmsbrook (from Tech Note 2a)	80	772	188	1,801
Adjacent Local Plan Sites (BTM less Elmsbrook)	93	889	337	3,239
Firethorn Development (As per the TA)	186	1,786	112	1,075
<b>Total</b>	<b>359</b>	<b>3,446</b>	<b>637</b>	<b>6,115</b>

3.4.8 The information presented above identifies that the maximum expected number of two-way vehicle movements across the bridge on Charlotte Avenue would be in the order of 6,115 vehicles per day. Of these, total two-way AADT flows of 1,075 (17.6%) are attributed to the proposed Firethorn development. Based on the above methodology, total two-way AADT flows of 1,801 (29.5%) are attributed to the permitted Elmsbrook development, and the remaining total two-way AADT flows of 3,239 (53.0%) are attributed to traffic flows utilising this route from the adjacent Local Plan developments.



3.4.9 Due to the limitations of the information that is available, the above results have been derived from the BTM flows and by assigning a level of traffic from the Elmsbrook development to the Braeburn Avenue link that is in line with the figures presented in Technical Note 2a from November 2010. This is identified as being 80 two-way movements in the AM peak hour.

3.4.10 It is acknowledged that there is no opportunity for the adjacent Local Plan developments to access Braeburn Avenue due to the bus only gate that prevents vehicular access from Charlotte Avenue to Braeburn Avenue. However, as we are utilising the flows that have been derived from the BTM for Braeburn Avenue and the permitted vehicle trips associated with the Elmsbrook development, there is an identified discrepancy.

#### Assessment 2

3.4.11 The BTM has identified a total of 173 vehicle movements on Braeburn Avenue, which could only be associated with Phases 3 & 4 of the Elmsbrook development due to the layout of the scheme and the fact that the bus only gate prevents access along the Spine Road.

3.4.12 By undertaking a simple review of the predicted level of traffic that could be generated by Phase 3 (89 dwellings) and Phase 4 (138 dwellings) of the Elmsbrook development and by utilising the up-to-date agreed trip rates that have been applied to the Firethorn development, the cumulative total of 227 dwellings would generate 123 two-way vehicle trips in the AM peak hour. This accounts for the difference in trip rates that have been applied to both private and affordable units.

3.4.13 This increase in development traffic is representative of approximately 154% more than that which was originally presented within Technical Note 2a, and it could therefore be assumed that all the traffic associated with the Elmsbrook development should be increased by this figure. It should be noted that there is no clear indication from the 2031 Base flows, which include the Elmsbrook development, just how much of this traffic is attributed to the Elmsbrook development. No details of trip rates, distribution or development content are set out, but as the Elmsbrook development was not only permitted when the BTM was updated, but was partially occupied in 2016, it is assumed that the BTM must have accurately considered the Elmsbrook development.

3.4.14 The results of this alternative assessment, which is effectively a sensitivity test that applies a higher level of traffic generation to the Elmsbrook development from that which was set out in the original assessment, that has been undertaken to determine traffic data associated with the adjacent Local Plan developments is presented in **Table 3-6**.



**Table 3-6: Assessment 2 - Traffic Data Link Assessment**

SCENARIO	BRAEBURN AVENUE (LINK 16)		CHARLOTTE AVENUE (LINK 17)	
	AM PEAK	AADT	AM PEAK	AADT
Base 2031	173	1,661	525	5,040
Elmsbrook (Revised trip rates)	123	1,1181	288	2,769
Adjacent Local Plan Sites (BTM less Elmsbrook)	50	480	237	2,271
Firethorn Development (As per the TA)	186	1,786	112	1,075
<b>Total</b>	<b>359</b>	<b>3,446</b>	<b>637</b>	<b>6,115</b>

3.4.15 The above sensitivity test does not propose to alter the level of agreed traffic generation from the proposed Firethorn development, nor does it propose to change the Base 2031 data from the BTM. As such, any increase in traffic associated with the Elmsbrook development must decrease the traffic predicted to be associated with the adjacent Local Plan developments. Whilst the proposed Firethorn development would still generate total two-way AADT flows of 1,075 (17.6%), the adjusted Elmsbrook development total two-way flows are identified as being 2,769 (45.3%) and the consequential flows associated with the adjacent Local Plan developments are identified as being 2,271 (37.1%).

**Summary**

3.4.16 The above assessments have identified that the proposed Firethorn development is predicted to have a 17.6% impact on the Spine Road at the critical point of the Charlotte Avenue bridge crossing.

3.4.17 As the level of traffic associated with the Elmsbrook development is not clearly defined from the BTM 2031 base flows, two methodologies have been adopted to identify that the traffic associated with the Elmsbrook development would range from having a 29.5% to 45.3% impact on the bridge crossing.

3.4.18 Finally, traffic associated with the adjacent Local Plan developments has been derived by subtracting the traffic associated with the Elmsbrook development from the 2031 Base traffic data from the BTM. As such, the adjacent Local Plan developments would range from having a 53.0% to 37.1% impact on the bridge crossing.



## 4 CUMULATIVE NETWORK IMPACT

### 4.1 SPINE ROAD SUITABILITY - PEDESTRIANS

4.1.1 OCC have no guidance on how to undertake an assessment of the suitability of various footway widths based on the anticipated levels of pedestrian flows.

4.1.2 As a result, reference is instead made to Appendix B of the Transport for London (TfL) Pedestrian Comfort Guidance for London (2019) document which sets out the recommended footway widths based on the number of pedestrian flows per hour (PPH). It is acknowledged that this guidance is for use in London, however in this instance it is appropriate as the document considers a range of footway widths and the associated 'comfort' based on a range of pedestrian flows.

4.1.3 The appropriate extract from this guidance is included at **ATTACHMENT 3** of this TN.

4.1.4 The cumulative assessment suggests that there will be a peak of approximately 426 two-way pedestrian movements or 426 PPH in total, with around half of the cumulative pedestrians assumed to utilise one footway on one side of the road at a time - which falls within an area classified as having a 'Low Flow' within the guidance, which includes all footways below 600PPH.

4.1.5 For 'Low Flow' routes, the TfL guidance document notes that the preferred width is 2.9m, however goes on to state (emphasis added):

*"In high street or tourist areas the total width can be reduced to 2.6m if there is no street furniture (except street lights) to allow space for people walking in couples or families and with prams etc.*

*In other areas, low flow streets can be 2m wide if there is no street furniture. This total width is required for two users to pass comfortably and to meet DfT minimum standards."*

4.1.6 VTP Drawing **4600-1100-T-025 Rev B** – Spine Road Footway Detail, a copy of which is included at **ATTACHMENT 4**, demonstrates that the majority of the footway widths are in excess of 2m.

4.1.7 On this basis, it is deemed that the existing pedestrian environment within the extents of the Spine Road is already appropriate to accommodate the likely demand from both the Elmsbrook development and the proposed Firethorn development.

### 4.2 SPINE ROAD SUITABILITY - CYCLISTS

4.2.1 In order to assess the suitability of the Spine Road for cyclists, reference is made to the Department for Transport (DfT) Local Transport Note (LTN) 1/20, dated July 2020. LTN 1/20 sets out the following key parameters which are discussed further within this section.

#### Parameter 1 - Recommended widths for Shared Pedestrian / Cyclist facilities

4.2.2 Table 6-3 of LTN 1/20 sets out the recommended widths for shared use cycle routes carrying up to 300 PPH, with it being recommended a shared footway width of 3.0m should be allowed for with cycle flows of up to 300 cyclists per hour. For cycle flows in excess of 300 cyclists per hour, a shared footway width of 4.5m is recommended. It is noted that the cumulative assessment of cyclists identifies a peak of 210 two-way cycle movements in the AM peak hour.

4.2.3 An extract of Table 6-3 taken directly from LTN 1/20 is replicated in **Figure 4-1**





Figure 4-1: LTN 1/20 Table 6-3 Extract

**Table 6-3: Recommended minimum widths for shared use routes carrying up to 300 pedestrians per hour**

Cycle flows	Minimum width
Up to 300 cyclists per hour	3.0m
Over 300 cyclists per hour	4.5m

**Parameter 2 - Inclusive Cycling and Requirement for Protection from Motor Traffic**

4.2.4 Figure 4.1 of LTN 1/20 sets out the requirement for protected cyclist infrastructure to accommodate the different types of cyclists, based on the speed of the road and anticipated 24-hour traffic flows. Figure 4.1 suggests that requiring cyclists to share the carriageway with general traffic, with traffic flows in excess of 6,000 vehicles per day, will only be suitable for a few cyclists and will exclude most potential users.

4.2.5 For completeness, an extract of Figure 4.1 of LTN 1/20 is provided in **Figure 4-2**.

Figure 4-2: LTN 1/20 Figure 4.1 Extract

Speed Limit <sup>1</sup>	Motor Traffic Flow (pcu/24 hour) <sup>2</sup>	Protected Space for Cycling			Cycle Lane (mandatory/ advisory)	Mixed Traffic
		Fully Kerbed Cycle Track	Stepped Cycle Track	Light Segregation		
20 mph <sup>3</sup>	0	Green	Green	Green	Green	Green
	2000	Green	Green	Green	Green	Green
	4000	Green	Green	Green	Yellow	Yellow
	6000+	Green	Green	Green	Yellow	Yellow
30 mph	0	Green	Green	Green	Yellow	Yellow
	2000	Green	Green	Green	Yellow	Yellow
	4000	Green	Green	Green	Yellow	Yellow
	6000+	Green	Green	Green	Yellow	Yellow
40 mph	Any	Green	Yellow	Yellow	Pink	Pink
50+ mph	Any	Green	Pink	Pink	Pink	Pink

- Provision suitable for most people
- Provision not suitable for all people and will exclude some potential users and/or have safety concerns
- Provision suitable for few people and will exclude most potential users and/or have safety concerns

- Notes:**
1. If the 85<sup>th</sup> percentile speed is more than 10% above the speed limit the next highest speed limit should be applied
  2. The recommended provision assumes that the peak hour motor traffic flow is no more than 10% of the 24 hour flow
  3. In rural areas achieving speeds of 20mph may be difficult, and so shared routes with speeds of up to 30mph will be generally acceptable with motor vehicle flows of up to 1,000 pcu per day

**LTN 1/20 Interpretation**

4.2.6 By applying the criteria within Parameter 1, considering that the number of cumulative pedestrian trips generated along the critical bridge crossing on the Spine Road will be shared across two footways, there will be less than 300PPH on each side of the road and less than 300 cyclists per hour. On that basis, LTN 1/20 suggests that a shared footway width of 3.0m is appropriate.



- 4.2.7 In relation to the existing footway width along the Spine Road, it is acknowledged that the vast majority of the Spine Road benefits from footways in excess of 3.0m, with the primary constraint identified at the bridge crossing of Charlotte Avenue, where it narrows to around 2.0m on both sides of the carriageway.
- 4.2.8 It is also noted that there are alternative routes available via side streets and the dedicated link between the two bridges on Charlotte Avenue that effectively bypasses the Gagle Brook Primary School. This link is presented on the VTP Drawing **4600-1100-T-025 Rev B**, a copy of which is contained at **ATTACHMENT 4**.
- 4.2.9 On that basis, it is considered that the majority of the Spine Road complies with the recommendations of LTN 1/20, with only the bridge crossing on Charlotte Avenue not meeting the recommendations of LTN 1/20.
- 4.2.10 With respect to Parameter 2, it is noted that the total traffic flows in the Base 2031 Do Something scenario exceeds 6,000 vehicles per day on Charlotte Avenue. It has been identified that the existing footway provision on either side of the bridge crossing is only 2.0m in width, which is suitable for pedestrians, but too narrow to accommodate both pedestrians and cyclists in accordance with LTN1/20, which identifies a minimum width of 3.0m for shared use. As such, LTN 1/20 suggests that the bridge crossing will only be suitable for some cyclists and will exclude some/most potential users.
- 4.2.11 It is also acknowledged that the Base 2031 (without traffic associated with the proposed Firethorn development) scenario exceeds 5,000 vehicles per day on Charlotte Avenue, which when applying the criteria set out in LTN 1/20 would still only be suitable for some cyclists and will exclude some/most potential users. Therefore, even without the addition of traffic flows, pedestrians and cyclists associated with the proposed Firethorn development, there is an existing constraint at this bridge crossing on Charlotte Avenue due to a lack of a segregated pedestrian/cycle route, which may not make cycling accessible for all.

## 4.3 MITIGATION

- 4.3.1 With respect to the link capacity on the critical part of the Spine Road, identified as being the bridge crossing of Charlotte Avenue, it is accepted that there is an existing design constraint which does not fully comply with the recommendations set out within LTN 1/20. For ease of reference, the traffic data from the BTM for the 2301 Base Year, which excludes any traffic associated with the proposed Firethorn development, identifies a total of approximately 5,050 two-way vehicle movements a day. This figure increases to approximately 6,150 two-way movements per day when the traffic from the Firethorn development is added to the 2031 Base flows. As noted within this TN, the traffic from the Firethorn development would account for approximately 17.6% of the total traffic on this link.
- 4.3.2 Figure 10 of the NW Bicester SPD identifies that the section of Charlotte Avenue that links the adjacent Local Plan developments near the Gagle Brook Primary School with the B4100, would be designated as a '*Primary Road with segregated footpath/cycleway*'. As the NW Bicester SPD was adopted after the Elmsbrook development had not only achieved planning consent, but this section of Charlotte Avenue had been constructed and achieved technical approval from OCC, the need to improve this existing stretch of Charlotte Avenue had already been identified. However, the NW Bicester APD does not propose any mitigation to improve this stretch of Charlotte Avenue to ensure that it could be a '*Primary Road with segregated footpath/cycleway*'.
- 4.3.3 It is acknowledged that the recommendations set out within LTN1/20 were developed after the design for Charlotte Avenue had been approved and implemented. It is however noted that LTN 1/20 is a guidance document only.



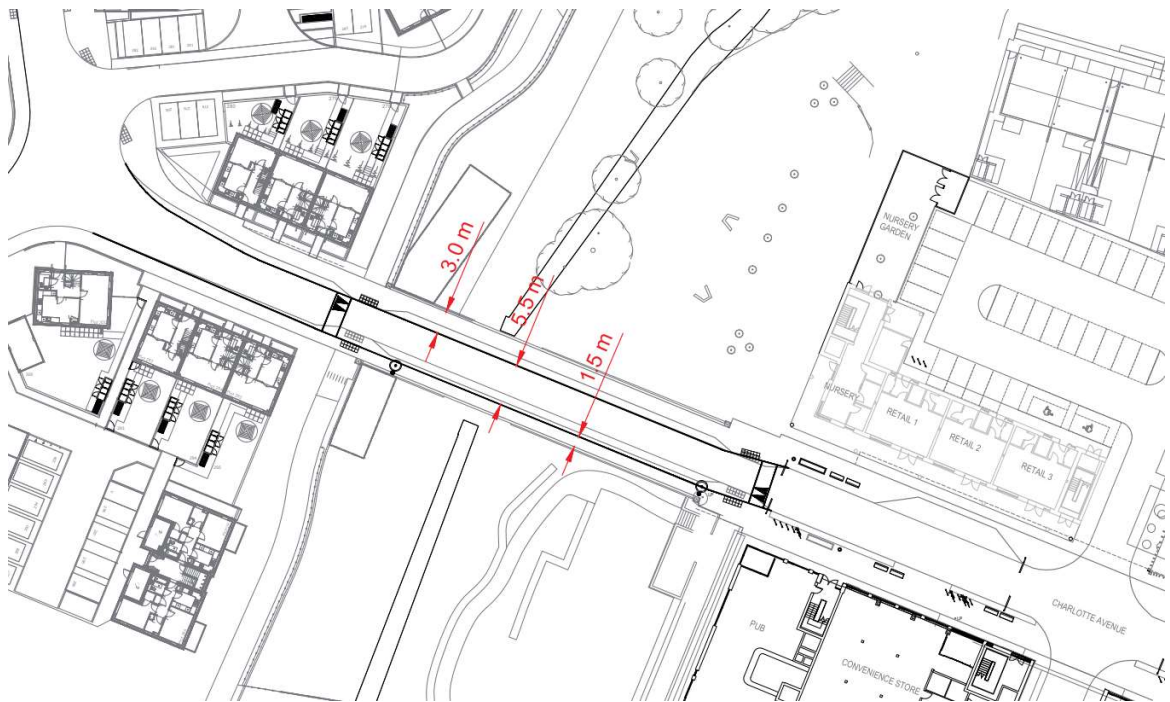
4.3.4 Notwithstanding the above, a series of mitigation options have been considered to suggest potential improvements that might ensure more appropriate compliance with LTN 1/20, as far as is reasonably practicable, which are summarised below.

**Option 1 - Bridge Improvements**

4.3.5 It is noted that the existing width across the key constraint. i.e. the bridge on Charlotte Avenue, is in the order of 10.0m. Existing footways of approximately 2.0m are provided on either side of the bridge and the road narrowings at either end of the bridge reduce the carriageway width of Charlotte Avenue to 4.1m. As such, the general carriageway width across the bridge and between the road narrowings either side of the bridge is approximately 6.0m.

4.3.6 VTP Drawing **4600-1100-T-029 Rev A** – Bridge Footway Provision proposes a physical improvement to the layout of Charlotte Avenue across the bridge to introduce a ‘*segregated footpath/cycleway*’. The full plan is included at **ATTACHMENT 4** of this TN and **Figure 4-3** presents an extract from this.

**Figure 4-3: Bridge Crossing of Charlotte Avenue**



4.3.7 Figure 4.1 of LTN 1/20 recommends that for carriageways that accommodate 6,000+ vehicle movements per day, a cycle lane should be provided to accommodate the majority of cyclists. Table 6-3 of LTN 1/20 recommends that for shared routes that accommodate up to 300 pedestrians per hour and up to 300 cyclists per hour, a width of 3.0m should be provided for a segregated shared route. If these figures are exceeded for a shared route, then the recommended width is 4.5m.

4.3.8 As it has been shown that the maximum hourly flows for pedestrians across the bridge might be in the order of 426 movements in the AM peak hour and the maximum number of cyclists might be 210 movements in the same period, the combined flows would just exceed the recommended combined total of 600 movements that could be accommodated within a single 3.0m shared route.



- 4.3.9 Assuming that the shared width of 3.0m provided for up to 300 pedestrians and up to 300 cyclists is shared between these different groups equally, i.e. 1.5m is available for pedestrians and 1.5m is available for cyclists, by providing an additional 1.5m footway on the southern side of the bridge for pedestrians only, there is the opportunity to allow for a reduction in pedestrian movements on the northern side of the bridge to utilise the shared footpath/cycleway. Assuming 126 pedestrians use the southern side, this would leave the maximum recommendation of up to 300 pedestrians on the shared route, which would therefore comply with the LTN 1/20 guidance.
- 4.3.10 By introducing the 3.0m wide shared footpath/cycleway on the northern side of the bridge and a narrow 1.5m footway on the southern side of the bridge, the remaining carriageway width would be 5.5m. This is considered to be an acceptable width for two-way traffic flows. Figure 7.1 of Manual for Street (MfS) notes that a width of 5.5m can accommodate two HGVs passing each other, which is considered to be a rare requirement for the Spine Road as no through traffic is expected to use this route.
- 4.3.11 It is acknowledged that the VTP proposals would recommend the removal of the road narrowings at either end of the bridge, which are acknowledged to act as a traffic calming feature. The VTP proposals suggest that a raised table might be introduced to act as a similar traffic calming feature at this location, which would not restrict the capacity of Charlotte Avenue, just help to reduce vehicles speeds to ensure that the design speed of 20mph is adhered to.
- 4.3.12 The VTP proposals show how the amendments to the bridge crossing might tie into the existing Spine Road without the need for substantial highway works and no disruption to the built development.
- 4.3.13 As the NW Bicester SPD recognised that in order to accommodate the traffic associated with the full development set out within the SPD, which includes that proposed at the Firethorn development, if it is proposed by OCC to deliver an improvement along this route to comply with the adopted SPD, a proportionate contribution to this improvement would be expected from the Firethorn development.
- Option 2 - Traffic Reduction from other developments within Local Plan:**
- 4.3.14 As per the assessment presented within this TN, it is evident that the vast majority of the traffic that has been identified as having an impact on the critical bridge crossing of Charlotte Avenue in the Base 2031 Do Something scenario (i.e. including the proposed Firethorn development) is associated with the adjacent Local Plan development, which accounts for between approximately 37% to 53% of the total traffic.
- 4.3.15 To reduce the level of traffic predicted to utilise the Spine Road, an appropriate measure could be implemented to restrict all or some access for vehicular traffic from the adjacent Local Plan development, effectively preventing this traffic joining the Spine Road and allowing access for pedestrians and cyclists only. A similar condition has been proposed for the proposed Firethorn development at the site access to the western parcel located to the south of the existing bus gate.
- 4.3.16 With the removal of some or all of this traffic, there would only be between approximately 2,900 to 3,850 daily vehicle movements across the bridge on Charlotte Avenue, which falls within the LTN 1/20 thresholds whereby cycling on the carriageway would be suitable for most people, or at the worst only exclude a small number of cyclists – which forms a substantive improvement from the Base 2031 scenario, whereby most cyclists are excluded.



4.3.17 The mechanism by which OCC could restrict vehicular access to the adjacent Local Plan development could be discussed further with the applicant(s) of the adjacent development at the appropriate time. If this traffic is to be restricted from accessing the Spine Road, there may be a need to update the BTM to reflect this change in traffic distribution.

### Option 3 - Further Traffic Restriction from the Proposed Firethorn Development

4.3.18 As an additional measure to support Option 2, the access points from the proposed Firethorn development could be restricted to no longer utilise Charlotte Avenue and instead access directly onto the B4100. In this scenario, it is noted that the Eastern Parcel will require the proposed temporary construction access arrangement to be made permanent. If this were to become a permanent means of access, it is likely that the arrangement of this junction would have to be reconsidered to provide a right turn lane from the B4100.

4.3.19 In this scenario, only the traffic associated with the existing Elmsbrook development might therefore be required to cross the bridge on Charlotte Avenue, which would therefore result in approximately 1,800 to 2,800 daily vehicle movements. This adjusted level of daily vehicular trips would make cycling accessible and suitable for almost all users.

### Option 4 - Shared Surface

4.3.20 As a further Option which could be developed further and to supplement the measures outlined above, the bridge crossing of Charlotte Avenue could be converted into a shared surface. It is noted that this measure would need to be implemented as part of a complementary measure to Option 2 or Option 3, which would restrict the amount of traffic that accesses the Spine Road and reduces the forecasted levels of traffic to the point whereby a shared surface would be appropriate.

## 4.4 SPINE ROAD SUITABILITY - VEHICLES

4.4.1 In relation to the suitability of the Spine Road for vehicles and whether it can accommodate the anticipated volumes of traffic, it is acknowledged that there is no current guidance or design criteria to determine this.

4.4.2 Reference is therefore made to the now superseded Design Manual for Roads and Bridges (DMRB) Volume 5 Section 1, TA 77/99. Table 2 of DMRB TA 77/99 sets out the capacities of Urban Roads, with the one-way hourly flows in each direction.

4.4.3 Of the road types set out within DMRB, it is considered that the Urban All Purpose Road Type 4 (UAP4) forms the most relevant comparison, as it is defined as an urban road carrying predominantly local traffic, providing access to local shops and businesses, with pedestrian crossings at grade and a speed limit of less than 30mph.

4.4.4 Table 2 of DMRB does not assess the capacity for roads below 6.1m width, so the ratio of flow to carriageway width will be extrapolated to provide an indication of the potential capacity along the Spine Road. Whilst it is acknowledged that this approach has limitations and is acknowledged as having too few examples to provide reliable data within the notes of TA 77/99, it is considered this approach provides an approximate indication of what level of traffic is appropriate, based on recorded and observed trends.

4.4.5 The extrapolated data suggests that every 1m of carriageway width can accommodate under 120 one-way hourly vehicles or a two-way capacity of under 200 two-way hourly vehicles.

4.4.6 The capacity of the Spine Road will be assessed for the average Spine Road width of 5.5m and the areas where the carriageway narrows to its tight point - which are identified as having a width of 4.1m.





4.4.7 The results of the Spine Road assessment and extrapolated values relevant to the Spine Road are presented in **Table 4-1**.

**Table 4-1: Extrapolated DMRB TA 77/99 Assessment**

CARRIAGEWAY WIDTH (UAP 4)	ONE WAY HOURLY CAPACITY (60% OF TWO WAY FLOW)	TWO WAY HOURLY CAPACITY (100%)
7.3m	1,140	1,900
6.75m	900	1,500
6.1m	750	1,250
5.5m	655	1,091
4.1m	482	804

4.4.8 **Table 4-1** suggests that a carriageway width of 5.5m will be able to accommodate a two-way capacity of up to 1,091 vehicles per hour, whilst a carriageway width of 4.1m will be able to accommodate a two-way capacity of up to 804 vehicles per hour.

4.4.9 In the future Base 2031 Do Something scenarios, there will be a total of 359 two-way AM peak hour vehicular trips on Braeburn Avenue and 636 two-way AM peak hour vehicular trips on Charlotte Avenue. As these flows are identified as being below the values extrapolated from DMRB, even in scenarios where the carriageway will reduce to 4.1m in width (804 two-way vehicles per hour), it is considered that the Spine Road is appropriate to accommodate the anticipated levels of vehicular traffic.



## 5 CONCLUSIONS

### 5.1 OVERVIEW

5.1.1 A summary of the suitability of the Spine Road is provided below in **Table 5-1**, which sets out whether the Spine Road complies with the parameters and criteria identified within this TN, as well as identifying whether any mitigation is required to satisfy these requirements.

**Table 5-1: Spine Road Suitability Summary**

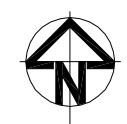
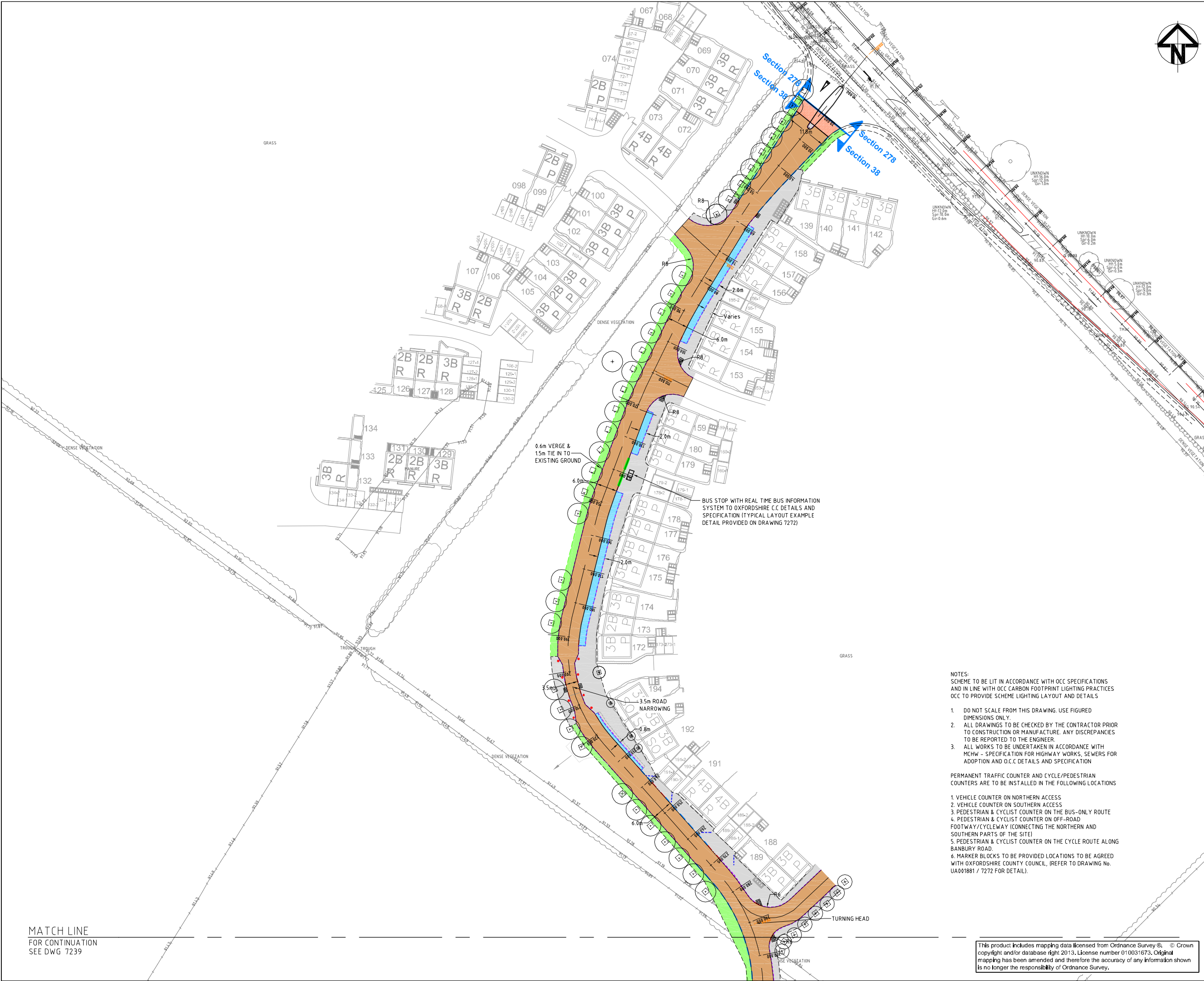
MODE OF TRANSPORT	SUITABILITY CRITERIA	COMPLIANCE	MITIGATION NEEDED
Pedestrians	TfL Pedestrian Comfort Level Guidance - suggests minimum footway width of 2m in areas where pedestrian flows are less than 600 PPH	Yes - footways of at least 2m are provided	-
Cyclists	LTN 1/20 - minimum width of 3m for shared pedestrian and cyclist facilities. Traffic flow in order of 6,000 vehicles per day requires protected cycle facilities to ensure cycling is inclusive to all.	No	A series of options have been proposed to improve the provision in line with LTN 1/20, to be discussed and agreed with OCC
Vehicles	Superseded DMRB TA 77/99 has been extrapolated to determine that carriageway widths of 5.5m and 4.1m can accommodate two-way hourly flows in the order of 1,091 and 804 hourly vehicles	Yes - projected traffic flows fall below 804 two-way hourly flows in the future Base 2031 Do Something scenario	-



# ATTACHMENT 1

S38 PLANS FOR EMSBROOK SPINE ROAD

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**KEY**

- PROPOSED ADOPTABLE CARRIAGEWAY
- PROPOSED ADOPTABLE FOOTWAY
- PROPOSED ADOPTABLE FOOTWAY/CYCLEWAY
- PROPOSED ADOPTABLE VERGE
- PROPOSED ADOPTABLE ROADSIDE SUDS FEATURE
- PROPOSED SUDS/POND FEATURE
- POND MAINTENANCE ACCESS (3.0m Wide)
- PROPOSED COMMUNITY STREET CONNECTION
- GATEWAY FEATURE (DETAIL IN ABEYANCE)
- VISIBILITY SPLAY - CONDITIONED RELATING TO HOUSEHOLD COVENANT
- UNCONTROLLED CROSSING POINT
- 40m FORWARD VISIBILITY SPLAY
- 2.4m x 33m VISIBILITY SPLAY
- 2m x 2m VISIBILITY SPLAY
- PROPOSED BOLLARD
- PROPOSED TREE AND TREE PIT (REFER TO DRAWING No. UA001881-707-018 FOR DETAILS)
- FULLY ENCLOSED 3 BAY PASSENGER SHELTER, DETAILS T.B.C BY OXFORDSHIRE C.C.

Issue	Description	Date
11	TREE LAYOUT REVISED	25/03/13
10	HIGHWAY BOUNDARY REVISED	06/11/12
09	SPINE ROAD TREE LAYOUT REVISED	26/10/12
08	GENERAL REVISIONS	19/10/12
07	MINOR REVISIONS	27/07/12
06	REVISED TO OCC COMMENTS	MAR 12
05	CARRIAGEWAY WIDTHS & BUS STOPS REVISED	02 Dec 11
04	FUTURE BUS STOP AND SPEED TABLE ADDED	04 NOV 11

Status: **DRAFT**

Scale	1:500	Author	M LLEWELLIN
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Grid	O.S.	© Copyright reserved	

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Project: **BICESTER ECO DEVELOPMENT EXEMPLAR SITE**

Title: **SPINE ROAD (S38) GENERAL ARRANGEMENT SHEET 1 OF 4**

Drawing No.	Project No.	Issue
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PERMANENT TRAFFIC COUNTER AND CYCLE/PEDESTRIAN COUNTERS ARE TO BE INSTALLED IN THE FOLLOWING LOCATIONS

- VEHICLE COUNTER ON NORTHERN ACCESS
- VEHICLE COUNTER ON SOUTHERN ACCESS
- PEDESTRIAN & CYCLIST COUNTER ON THE BUS-ONLY ROUTE
- PEDESTRIAN & CYCLIST COUNTER ON OFF-ROAD FOOTWAY/CYCLEWAY (CONNECTING THE NORTHERN AND SOUTHERN PARTS OF THE SITE)
- PEDESTRIAN & CYCLIST COUNTER ON THE CYCLE ROUTE ALONG BANBURY ROAD.
- MARKER BLOCKS TO BE PROVIDED LOCATIONS TO BE AGREED WITH OXFORDSHIRE COUNTY COUNCIL, (REFER TO DRAWING No. UA001881 / 7272 FOR DETAIL).

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KEY	
	PROPOSED ADOPTABLE CARRIAGEWAY
	PROPOSED ADOPTABLE FOOTWAY
	PROPOSED ADOPTABLE FOOTWAY/CYCLEWAY
	PROPOSED ADOPTABLE VERGE
	PROPOSED ADOPTABLE ROADSIDE SUDS FEATURE
	PROPOSED SUDS/POND FEATURE
	POND MAINTENANCE ACCESS (3.0m Wide)
	PROPOSED COMMUNITY STREET CONNECTION
	GATEWAY FEATURE (DETAIL IN ABEYANCE)
	VISIBILITY SPLAY - CONDITIONED RELATING TO HOUSEHOLD COVENANT
	UNCONTROLLED CROSSING POINT
	4.0m FORWARD VISIBILITY SPLAY
	2.4m x 33m VISIBILITY SPLAY
	2m x 2m VISIBILITY SPLAY
	PROPOSED BOLLARD
	PROPOSED TREE AND TREE PIT (REFER TO DRAWING No. UA001881-707-018 FOR DETAILS)
	FULLY ENCLOSED 3 BAY PASSENGER SHELTER, DETAILS T.B.C BY OXFORDSHIRE C.C.

Issue	Description	Date
14	MINOR REVISIONS	17/05/13
13	TREE LAYOUT REVISED	25/03/13
12	HIGHWAY BOUNDARY REVISED	06/11/12
11	SPINE ROAD TREE LAYOUT REVISED	26/10/12
10	GENERAL REVISIONS	18/10/12
09	MASTERPLAN REVISED	05/10/12
08	CATTLE CROSSING NOTE AMENDED	07/09/12
07	MINOR REVISIONS	11/07/12
06	REVISED TO OCC COMMENTS	MAR 12
05	CARRIAGEWAY WIDTHS & BUS STOPS REVISED	02 Dec 11
04	FUTURE BUS STOP AND SPEED TABLE ADDED	04 NOV 11

Status: **DRAFT**

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Project: **BICESTER ECO DEVELOPMENT EXEMPLAR SITE**

Title: **SPINE ROAD (S38) GENERAL ARRANGEMENT SHEET 2 OF 4**

Drawing No.	Project No.	Issue
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- PERMANENT TRAFFIC COUNTER AND CYCLE/PEDESTRIAN COUNTERS ARE TO BE INSTALLED IN THE FOLLOWING LOCATIONS
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  - VEHICLE COUNTER ON SOUTHERN ACCESS
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  - PEDESTRIAN & CYCLIST COUNTER ON OFF-ROAD FOOTWAY/CYCLEWAY (CONNECTING THE NORTHERN AND SOUTHERN PARTS OF THE SITE)
  - PEDESTRIAN & CYCLIST COUNTER ON THE CYCLE ROUTE ALONG BANBURY ROAD
  - MARKER BLOCKS TO BE PROVIDED LOCATIONS TO BE AGREED WITH OXFORDSHIRE COUNTY COUNCIL, (REFER TO DRAWING No. UA001881 / 7272 FOR DETAIL).

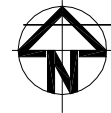
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**KEY**

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- PROPOSED ADOPTABLE FOOTWAY/CYCLEWAY
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Issue	Description	Date
14	ROAD CROSSING ADDED AT CH. 631	17/05/13
13	TREE LAYOUT REVISED	25/03/13
12	HIGHWAY BOUNDARY REVISED	06/11/12
11	SPINE ROAD TREE LAYOUT REVISED	26/10/12
10	GENERAL REVISIONS	18/10/12
09	MASTERPLAN REVISED	05/10/12
08	FOOTPATHS REVISED	07/09/12
07	MINOR REVISIONS	11/07/12
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Status: **DRAFT**

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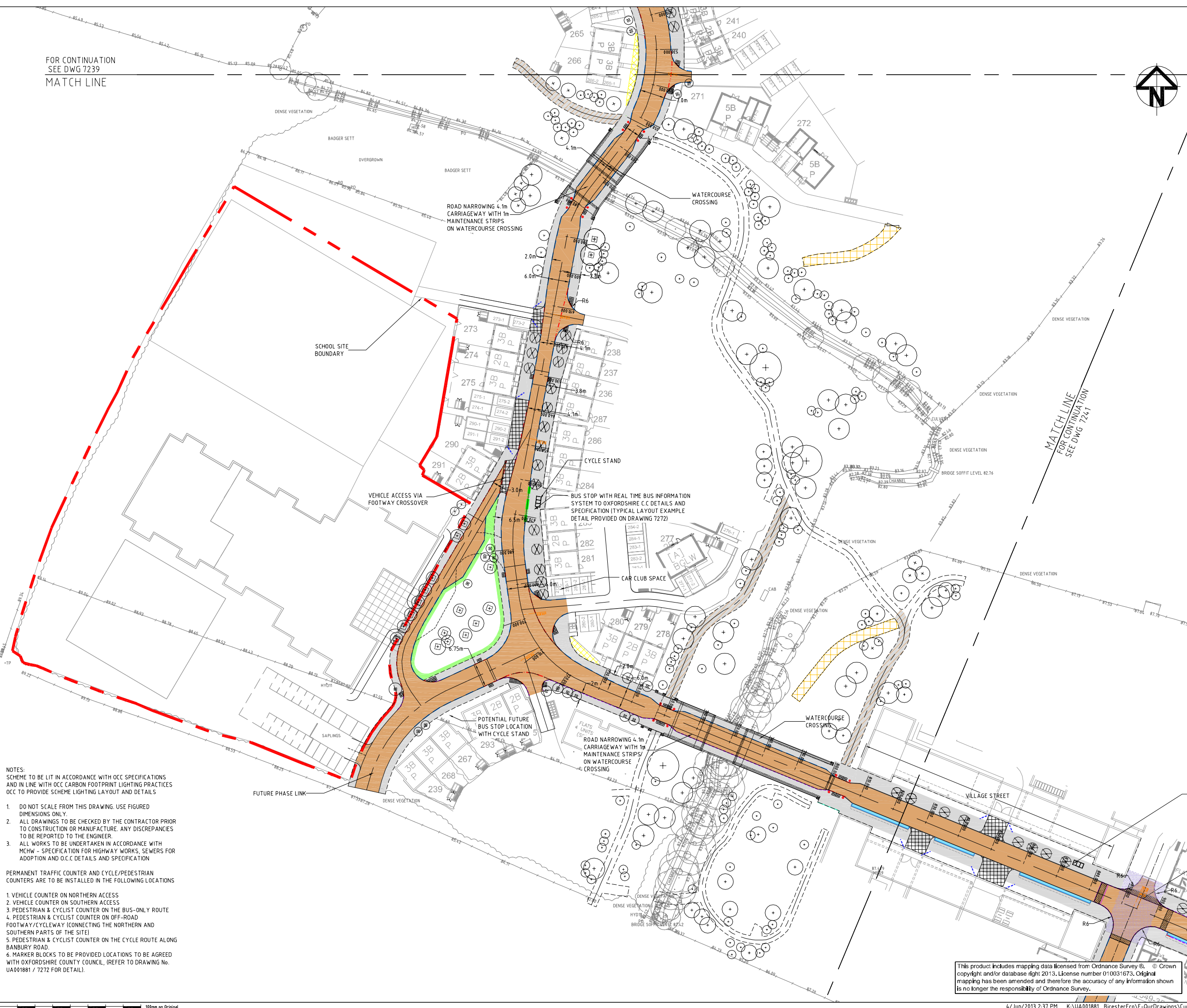
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Project: **BICESTER ECO DEVELOPMENT EXEMPLAR SITE**

Title: **SPINE ROAD (S38) GENERAL ARRANGEMENT SHEET 3 OF 4**

Drawing No.	Project No.	Issue
7240	UA001881	14

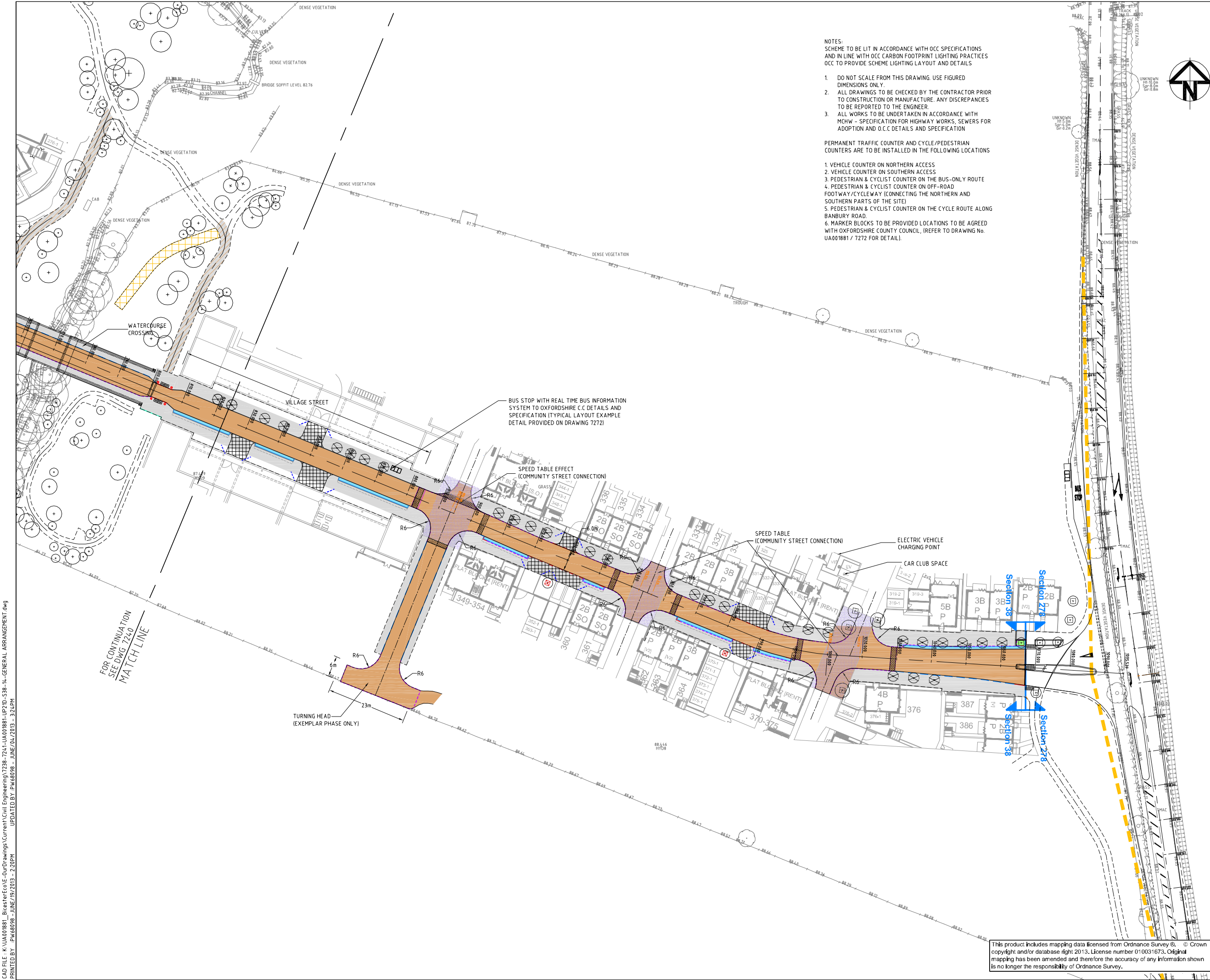
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- PERMANENT TRAFFIC COUNTER AND CYCLE/PEDESTRIAN COUNTERS ARE TO BE INSTALLED IN THE FOLLOWING LOCATIONS
- VEHICLE COUNTER ON NORTHERN ACCESS
  - VEHICLE COUNTER ON SOUTHERN ACCESS
  - PEDESTRIAN & CYCLIST COUNTER ON THE BUS-ONLY ROUTE
  - PEDESTRIAN & CYCLIST COUNTER ON OFF-ROAD FOOTWAY/CYCLEWAY (CONNECTING THE NORTHERN AND SOUTHERN PARTS OF THE SITE)
  - PEDESTRIAN & CYCLIST COUNTER ON THE CYCLE ROUTE ALONG BANBURY ROAD.
  - MARKER BLOCKS TO BE PROVIDED LOCATIONS TO BE AGREED WITH OXFORDSHIRE COUNTY COUNCIL, (REFER TO DRAWING No. UA001881 / 7272 FOR DETAIL).

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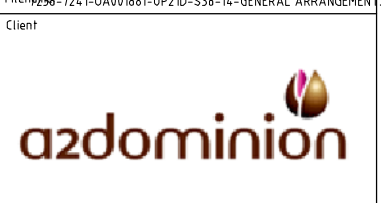
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KEY	
	PROPOSED ADOPTABLE CARRIAGEWAY
	PROPOSED ADOPTABLE FOOTWAY
	PROPOSED ADOPTABLE FOOTWAY/CYCLEWAY
	PROPOSED ADOPTABLE VERGE
	PROPOSED ADOPTABLE ROADSIDE SUDS FEATURE
	PROPOSED SUDS/POND FEATURE
	POND MAINTENANCE ACCESS (3.0m Wide)
	PROPOSED COMMUNITY STREET CONNECTION
	GATEWAY FEATURE (DETAIL IN ABEYANCE)
	VISIBILITY SPLAY - CONDITIONED RELATING TO HOUSEHOLD COVENANT
	UNCONTROLLED CROSSING POINT
	40m FORWARD VISIBILITY SPLAY
	2.4m x 33m VISIBILITY SPLAY
	2m x 2m VISIBILITY SPLAY
	PROPOSED BOLLARD
	PROPOSED TREE AND TREE PIT (REFER TO DRAWING No. UA001881-707-018 FOR DETAILS)
	FULLY ENCLOSED 3 BAY PASSENGER SHELTER, DETAILS T.B.C BY OXFORDSHIRE C.C.

Issue	Description	Date
12	TREE LAYOUT REVISED	25/03/13
11	HIGHWAY BOUNDARY REVISED	06/11/12
10	SPINE ROAD TREE LAYOUT REVISED	26/10/12
09	GENERAL REVISIONS	19/10/12
08	FOOTPATHS REVISED	07/09/12
07	MINOR REVISIONS	11/07/12
06	REVISED TO OCC COMMENTS	MAR 12
05	CARRIAGEWAY WIDTHS & BUS STOPS REVISED	02 Dec 11
04	FUTURE BUS STOP AND SPEED TABLE ADDED	04 NOV 11

Status	DRAFT	
Scales	1:500	Author M.LLEWELIN
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Project  
 BICESTER ECO DEVELOPMENT EXEMPLAR SITE

Title  
 SPINE ROAD (S38) GENERAL ARRANGEMENT SHEET 4 OF 4

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# ATTACHMENT 2

TN2A – TRIP RATES AND TRAFFIC GENERATION (NOVEMBER 2010)

# TECHNICAL NOTE 2a:

## Trip Rates and Traffic Generations: Exemplar Site

**Issue date** 16<sup>th</sup> November 2010  
**Prepared by** Janice Hughes, Hyder  
**Subject** NW Bicester Exemplar Site – Trip Rates and Traffic Generations  
**Reference** 0002-UA001881-NEL-03  
**Sent to** Jacqui Cox (OCC)  
Michael Deadman (OCC)  
Kathryn Kennell (Hyder)  
Dan Hammond (Hyder)  
Philip Harker (Hyder)

## 1 Introduction

Following a meeting that took place on 6<sup>th</sup> September 2010 with representatives of Oxfordshire County Council (OCC), Cherwell District Council, Halcrow and Hyder Consulting, it was agreed that Hyder would prepare a Technical Note setting out the proposed development trip rates for the NW Bicester site.

A previous version of this Technical Note was issued on 6<sup>th</sup> October 2010, which has now been superseded by this revised note to reflect alterations to the proposed development schedule for the Exemplar Site. It is therefore considered appropriate to circulate this note once more to reflect the revised and final traffic generations for the proposed Exemplar Site development. It is important to note that the applied trip rates have not changed from those included within the previous version of the Technical Note dated 6<sup>th</sup> October 2010.

For clarity, this note deals with the Exemplar Site and Technical Note 2b will address the Masterplan Site.

This note therefore sets out the methodology for total person and vehicular trip rates and also addresses the relationship between the trip rates and modal share targets for the proposed development.

Trip rates have been examined separately for each of the main land use categories anticipated to form part of the exemplar. Trip rates are given for the AM and PM peak hours (8-9am and 5-6pm) and in total for the 12 hour (7am-7pm) period.

At the end of the technical note, the anticipated vehicle and non vehicular generation for the Exemplar Site is summarised, based on the trip rates set out in the note. Issues of reduction for containment are also discussed.

## 2 Proposed Land Uses

**Table 1** below provides a schedule of the proposed Exemplar Site land uses. These may be subject to later amendment but are considered to be robust (i.e. worst case) numbers of dwellings and floorspace.

**Table 1: Exemplar Site Development Schedule (Full and Outline Application)**

Land Use	Floorspace / Units
<b>Residential - Total</b>	<b>393 units</b>
	69.2% Market housing = 270 units
	30.8% Affordable housing = 123 units

Land Use	Floorspace / Units
<b>Primary School</b>	1 form entry with nursery, assume 135 pupils
<b>Retail</b>	Co-operative local store 550m <sup>2</sup> Post Office 150m <sup>2</sup> Pharmacy 110m <sup>2</sup> Hairdressers 110m <sup>2</sup>
<b>Community Facilities</b>	Eco Pub 190m <sup>2</sup> Community hall 580m <sup>2</sup> Children's nursery 40 spaces/350m <sup>2</sup> Allotments
<b>Eco Business Centre</b>	1,800m <sup>2</sup> B1 floorspace
<b>B1 Offices</b>	1,100m <sup>2</sup> B1 floorspace
<b>Energy Centre</b>	400m <sup>2</sup>

This Technical Note addresses the trip rates associated with the land uses as given above. Trip rates are not assessed for the green infrastructure or woodland cemetery provision.

## 3 Total Person Trip Rates

The following sections provide a summary of total person trip rates for each of the proposed land uses at the Exemplar Site. These total person trip rates have been obtained from the TRICS database. The TRICS (multi-modal survey) sites that have been used to generate total person trip rates were selected based on their similarity to the development proposals at the Exemplar Site.

### 3.1 Market and Affordable Housing

The TRICS residential sites used in the assessment are detailed in **Table 2** and **Table 3**. The number of dwellings in the selected sites is relatively low given a lack of information for larger sites.

The initial total person trip rates are shown in the tables. It can be seen that overall each private household is estimated to make **4.41** outbound and **4.11** inbound trips in a 12 hour period (**8.51** in total, two-way). This can be compared to the 2007 Travel Diary Survey which recorded each household making an average of **9.78** trip stages over the day, of which a proportion are between other off site origins and destinations. The total trips derived from TRICS are thus considered to robustly reflect the Bicester situation.

**Table 2: Private Residential Dwellings Total Person Trip Rates (per dwelling)**

	Arrivals	Departures	Total
<b>AM Peak Hour</b>	0.236	0.862	<b>1.098</b>
<b>PM Peak Hour</b>	0.616	0.377	<b>0.993</b>
<b>12 hour</b>	4.105	4.407	<b>8.512</b>

**Table 3: Affordable Residential Dwellings Total Person Trip Rates (per dwelling)**

	Arrivals	Departures	Total
<b>AM Peak Hour</b>	0.189	0.690	<b>0.878</b>
<b>PM Peak Hour</b>	0.493	0.302	<b>0.794</b>
<b>12 hour</b>	3.284	3.526	<b>6.810</b>

### 3.2 Education – Primary School

The education trip rates have been derived from TRICS data for primary schools. **Table 4** summarises total person trips to/from primary schools as derived from TRICS. The TRICS



dataset indicates that 42% and 78% of total person trips are by vehicle modes in the morning and evening peak hours respectively.

**Table 4: Primary School Total Person Trip Rates (per pupil)**

	Arrivals	Departures	Total
<b>AM Peak Hour</b>	1.275	0.257	<b>1.532</b>
<b>PM Peak Hour</b>	0.026	0.052	<b>0.078</b>
<b>12 hour</b>	2.344	2.289	<b>4.633</b>

### 3.3 Retail – Local Shops

The total person trip rates for retail have been taken from TRICS for local shopping areas. **Table 5** shows total person trip rates per 100m<sup>2</sup> of gross retail floorspace.

**Table 5: Retail (Local Shopping) Total Person Trip Rates (per 100sqm)**

	Arrivals	Departures	Total
<b>AM Peak Hour</b>	14.642	13.487	<b>28.129</b>
<b>PM Peak Hour</b>	9.030	9.538	<b>18.568</b>
<b>12 hour</b>	133.697	136.844	<b>270.541</b>

### 3.4 Eco Pub Trip Rates

Total person trip rates for the proposed Eco Pub have been obtained from the TRICS database, and **Table 6** shows trip rates per 100m<sup>2</sup> of gross retail floorspace. These trip rates do not take account of the likely increased containment of trips within the site i.e. those people who live within the Eco Town and who will represent a large proportion of customers.

**Table 6: Eco Pub Total Person Trip Rates (per 100sqm)**

	Arrivals	Departures	Total
<b>AM Peak Hour</b>	0.000	0.000	<b>0.000</b>
<b>PM Peak Hour</b>	10.835	7.017	<b>17.852</b>
<b>12 hour</b>	97.430	97.570	<b>195.000</b>

### 3.5 Community Hall

Total person trip rates for the proposed community hall have been extracted from the TRICS database, and are shown in **Table 7** below.

**Table 7: Community Hall Total Person Trip Rates (per 100sqm)**

	Arrivals	Departures	Total
<b>AM Peak Hour</b>	1.068	0.519	<b>1.587</b>
<b>PM Peak Hour</b>	1.802	0.950	<b>2.752</b>
<b>12 hour</b>	23.150	23.985	<b>47.135</b>

### 3.6 Education – Children’s Nursery

Total person trip rates have been derived from TRICS for a children’s day care nursery per 100sqm and are shown in **Table 8** below. Whilst it is likely that the modal share by car will be high for dropping off children, many vehicle trips will be linked to journeys to work.

**Table 8: Children’s Nursery Total Person Trip Rates (per 100sqm)**

	Arrivals	Departures	Total
<b>AM Peak Hour</b>	5.109	2.282	<b>7.391</b>
<b>PM Peak Hour</b>	1.737	5.007	<b>6.744</b>
<b>12 hour</b>	18.528	18.698	<b>37.226</b>

## 3.7 Employment – Office

Total person trip rates for office uses have been derived from TRICS for office sites, and these have been summarised in **Table 9** below.

**Table 9: Office Total Person Trip Rates (per 100sqm)**

	Arrivals	Departures	Total
<b>AM Peak Hour</b>	4.080	0.322	<b>4.402</b>
<b>PM Peak Hour</b>	0.379	3.370	<b>3.749</b>
<b>12 hour</b>	17.966	17.173	<b>35.139</b>

It is worth noting that the trip rates presented in **Table 9** do not take account of containment of trips within the site i.e. those people who live within the Eco Town as well as work there.

## 3.8 Exemplar Site – Total Person Trip Rate Summary

**Table 10** summarises the total person trip rates for the proposed Exemplar Site land uses based on the trip rates presented in **Table 2** to **Table 9**.

**Table 10: Summary of Total Person Trip Rates – Exemplar Site**

Land Use(s)	Morn Peak (8-9am)			Evening Peak (5-6pm)		
	Arr	Dep	Tot	Arr	Dep	Tot
<b>Residential - Private</b>	0.236	0.862	1.098	0.616	0.377	0.993
<b>*Residential - Affordable</b>	0.189	0.690	0.878	0.493	0.302	0.794
<b>Primary School</b>	1.275	0.257	1.532	0.026	0.052	0.078
<b>Local Shops</b>	14.642	13.487	28.129	9.030	9.538	18.568
<b>Eco Pub</b>	0.000	0.000	0.000	10.835	7.017	17.852
<b>Community Hall</b>	1.068	0.519	1.587	1.802	0.950	2.752
<b>Children's Nursery</b>	5.109	2.282	7.391	1.737	5.007	6.744
<b>Eco Business Centre</b>	4.080	0.322	4.402	0.379	3.370	3.749
<b>Factor of 0.80 applied to account for affordable housing generating 20% fewer trips than private housing</b>						

## 4 Mode Share

Detailed in **Table 11** is a summary of mode share for each of the proposed land uses at the Exemplar Site by vehicular and non-vehicular travel modes. These mode shares have primarily been derived from the multi-modal information that has been obtained from the TRICS database. With regards to modal share of household trips (i.e. the generation from residential uses) the modal share from the 2007 Bicester Travel Diary Mode Share for all daily trips has been used, as detailed in **Table 12**.

**Table 11: TRICS/ 2007 Travel Diary derived mode share for the Exemplar Site**

Land Use(s)	Morn Peak (8-9am)			Evening Peak (5-6pm)		
	Veh	Non-V	Tot	Veh	Non-V	Tot
<b>Residential - Private</b>	67.5%	32.5%	100%	67.5%	32.5%	100%
<b>Residential - Affordable</b>	67.5%	32.5%	100%	67.5%	32.5%	100%
<b>Primary School</b>	42%	58%	100%	78%	22%	100%
<b>Local Shops</b>	42%	58%	100%	57%	43%	100%
<b>Eco Pub</b>	0%	0%	0%	88%	12%	100%
<b>Community Hall</b>	50%	50%	100%	65%	35%	100%
<b>Children's Nursery</b>	81%	19%	100%	71%	29%	100%
<b>Eco Business Centre</b>	74%	26%	100%	77%	23%	100%

**Table 12: 2007 Bicester Travel Diary Mode Share - All Daily Trip Purposes**

Method of Travel	%age	%age	Mode
<b>Car driver</b>	47.4%	64.4%	Car
<b>Car passenger</b>	17.0%		
<b>Light goods van</b>	2.9%	3.1%	Goods vehicles
<b>Heavy goods vehicle</b>	0.2%		
<b>Bus passenger</b>	3.5%	32.5%	Non vehicular modes
<b>Train passenger</b>	0.5%		
<b>Motorcycle</b>	0.4%		
<b>Bicycle</b>	3.4%		
<b>Walk</b>	23.3%		
<b>Taxi</b>	0.5%		
<b>Coach passenger</b>	0.2%		
<b>School bus</b>	0.7%		
<b>Community transport</b>	0.0%		
<b>Total</b>	100%	100%	

It has been calculated that the proposed mix and scale of development at the Exemplar Site would result in **61%** of all trips being undertaken by vehicle modes, with **39%** utilising non-vehicular modes (based on the mode share data extrapolated from TRICS and the 2007 Bicester Travel Diary Survey).

The guidance in the annex to PPS1 sets out the aim of achieving at least 50% of trips arising from the development (i.e. from resident households) by non car modes. It is recognised that prior to the development of the masterplan site (i.e. the 5,000 homes (3,000 by 2026) and related land uses), it will be more challenging to achieve the 50:50 target modal share. The development of the adjacent parts of the overall site will lead to a step change in bus services (from 30 minute to 15 minute frequencies) and considerably enhanced provision for walking and cycling. A target modal share for 2016 (i.e. the short term post development of the exemplar site) is therefore proposed as **55%** vehicle modes and **45%** non vehicle modes. This would achieve a higher non vehicular modal share or trips than Bicester at present, with a **50%** non vehicular modal share being the target for 2026.

Detailed in **Table 13** is a summary of the vehicular and non-vehicular mode share targets in 2016 for the Exemplar Site by each land use, which given the current development mix would give a 55:45 modal share. **Table 14** shows the target modal share by land use in 2026 to give a

50:50 modal share. These target mode shares are considered to appropriately reflect the future level of accessibility at the site in the two assessment years.

**Table 13: Summary of Mode Share Targets – Exemplar Site, 2016**

Land Use(s)	Morn Peak (8-9am)			Evening Peak (5-6pm)		
	Veh	Non-V	Tot	Veh	Non-V	Tot
<b>Residential - Private</b>	60%	40%	100%	60%	40%	100%
<b>Residential - Affordable</b>	60%	40%	100%	60%	40%	100%
<b>Primary School</b>	30%	70%	100%	30%	70%	100%
<b>Local Shops</b>	50%	50%	100%	50%	50%	100%
<b>Eco Pub</b>	0%	0%	0%	45%	55%	100%
<b>Community Hall</b>	50%	50%	100%	50%	50%	100%
<b>Children's Nursery</b>	70%	30%	100%	70%	30%	100%
<b>Eco Business Centre</b>	70%	30%	100%	70%	30%	100%

**Table 14: Summary of Mode Share Targets – Exemplar Site, 2026**

Land Use(s)	Morn Peak (8-9am)			Evening Peak (5-6pm)		
	Veh	Non-V	Tot	Veh	Non-V	Tot
<b>Residential - Private</b>	55%	45%	100%	55%	45%	100%
<b>Residential - Affordable</b>	55%	45%	100%	55%	45%	100%
<b>Primary School</b>	30%	70%	100%	30%	70%	100%
<b>Local Shops</b>	40%	60%	100%	40%	60%	100%
<b>Eco Pub</b>	0%	0%	0%	45%	55%	100%
<b>Community Hall</b>	40%	60%	100%	40%	60%	100%
<b>Children's Nursery</b>	70%	30%	100%	70%	30%	100%
<b>Eco Business Centre</b>	65%	35%	100%	65%	35%	100%

## 5 Person Trip Generation

Using the modal share targets in 2016 and 2026, the peak hour generation of vehicular and non vehicular trips has been calculated and are summarised in **Table 15**. It should be noted that vehicular trips relates to person trips in vehicles, rather than actual vehicle numbers (i.e. traffic generation). They also include both internal and external trips to the development site.

**Table 15: Exemplar Site Vehicular and Non Vehicular Trip Generation**

Year	Morning peak hour (8-9am)						Evening peak hour (5-6pm)					
	Arrivals			Departures			Arrivals			Departures		
	Veh	Non-V	Tot	Veh	Non-V	Tot	Veh	Non-V	Tot	Veh	Non-V	Tot
2016	268	266	534	270	215	485	201	154	355	211	144	355
2026	244	290	534	241	244	485	180	175	355	190	164	355

## 6 Non-Vehicle Modes

The total person trips generated by the exemplar land uses by non-vehicle modes are shown in **Table 16** for 2016 and 2026. **Table 16** shows the existing modal share in Bicester from the 2007 Travel Diary Surveys for comparison and puts forward an indicative target modal share for each non vehicle mode, as a proportion of total trips in 2016 and 2026. The growth in train passengers is an indicative figure assuming the implementation of the Evergreen 3 Chiltern Railways proposal.

**Table 16: Non Vehicle Modes Share 2016 and 2026**

	2007 Bicester		2016 Exemplar		2026 Exemplar	
<b>Car driver</b>	47.40%	Vehicle	34.90%	Vehicle	29.90%	Vehicle
<b>Car passenger</b>	17.00%	67.5%	17.00%	55%	17.00%	50%
<b>Light goods van</b>	2.90%		2.90%		2.90%	
<b>Heavy goods vehicle</b>	0.20%		0.20%		0.20%	
<b>Bus passenger</b>	3.50%		5.50%		7.50%	
<b>Train passenger</b>	0.50%		3.00%		3.00%	
<b>Motorcycle</b>	0.40%		0.60%		0.60%	
<b>Bicycle</b>	3.40%	Non	6.00%	Non	7.00%	Non
<b>Walk</b>	23.30%	Vehicle	28.00%	Vehicle	30.00%	Vehicle
<b>Taxi</b>	0.50%	32.5%	0.50%	45%	0.50%	50%
<b>Coach passenger</b>	0.20%		0.20%		0.20%	
<b>School bus</b>	0.70%		0.70%		0.70%	
<b>Community transport</b>	0.00%		0.50%		0.50%	
<b>Total</b>	100%	100%	100.00%	100%	100%	100%

Using the percentages of person trips given in the above table, the forecast numbers of bus passengers in the AM and PM peak hours in 2016 and 2026 are shown in **Table 17**.

**Table 17: Exemplar Site Forecast Bus Patronage 2016 and 2026**

Bus Patronage	2016	2026
<b>AM arrival</b>	15	22
<b>AM depart</b>	12	18
<b>AM total</b>	27	40
<b>PM arrival</b>	8	13
<b>PM depart</b>	8	12
<b>PM total</b>	16	25

# 7 Traffic Generation

## 7.1 Vehicle Occupancies

It is important to note that the trip rates included within the preceding sections relate to total people, meaning that it is necessary to calculate and apply appropriate vehicle occupancy rates in order to forecast the level of development traffic that could be generated by the Exemplar Site (relevant to each of the proposed land uses). Detailed in **Table 18** is a summary of vehicle occupancies by trip purpose, which have been sourced from the 2007 Bicester Travel Diary Survey.

**Table 18: Vehicle Occupancies by Trip Purpose**

Land Use(s)	Morn Peak (8-9am)			Evening Peak (5-6pm)		
	Arr	Dep	Tot	Arr	Dep	Tot
<b>Residential - Privately Owned</b>	1.5	1.5	<b>1.5</b>	1.5	1.5	<b>1.5</b>
<b>Residential - Affordable Housing</b>	1.5	1.5	<b>1.5</b>	1.5	1.5	<b>1.5</b>
<b>Primary School</b>	2.2	2.2	<b>2.2</b>	2.2	2.2	<b>2.2</b>
<b>Local Shops</b>	1.5	1.5	<b>1.5</b>	1.5	1.5	<b>1.5</b>
<b>Eco Pub</b>	1.6	1.6	<b>1.6</b>	1.6	1.6	<b>1.6</b>
<b>Community Hall</b>	1.6	1.6	<b>1.6</b>	1.6	1.6	<b>1.6</b>
<b>Children's Nursery</b>	2.2	2.2	<b>2.2</b>	2.2	2.2	<b>2.2</b>
<b>Eco Business Centre/B1 Office</b>	1.1	1.1	<b>1.1</b>	1.1	1.1	<b>1.1</b>

Detailed in **Table 19** and **Table 20** is a summary of the development traffic generations associated with the Exemplar Site in 2016 and 2026, based on the application of the vehicle occupancies to person trips by vehicle by each land use.

**Table 19: Exemplar Site Traffic Generation (Internal and External) 2016**

Land Use(s)	Calculation Factor			Units / pupils / sq.m	Morning peak hour (8-9am)		Evening peak hour (5-6pm)	
	Per	no of	units		Arr	Dep	Arr	Dep
<b>Residential - Private</b>	Per	no of	units	270	25	92	66	38
<b>Residential - Affordable</b>	Per	no of	units	123	9	33	24	14
<b>Primary School</b>	Per	no of	pupils	135	23	5	0	1
<b>Local Shops</b>	Per	100	sq.m	920	44	41	27	29
<b>Eco Pub</b>	Per	100	sq.m	190	0	0	6	4
<b>Community Hall</b>	Per	100	sq.m	580	2	1	3	2
<b>Children's Nursery</b>	Per	100	sq.m	350	6	3	2	5
<b>Eco Business Centre + B1 Office</b>	Per	100	sq.m	2,900	74	6	7	61



Land Use(s)	Calculation Factor	Units / pupils / sq.m	Morning peak hour (8-9am)		Evening peak hour (5-6pm)	
			Arr	Dep	Arr	Dep
<b>Total</b>			<b>184</b>	<b>180</b>	<b>136</b>	<b>154</b>

**Table 20: Exemplar Site Traffic Generation (Internal and External) 2026**

Land Use(s)	Calculation Factor	Units / pupils / sq.m	Morning peak hour (8-9am)		Evening peak hour (5-6pm)	
			Arr	Dep	Arr	Dep
<b>Residential - Private</b>	Per no of units	270	23	84	60	35
<b>Residential - Affordable</b>	Per no of units	123	8	31	22	13
<b>Primary School</b>	Per no of pupils	135	23	5	0	1
<b>Local Shops</b>	Per 100 sq.m	920	36	33	22	23
<b>Eco Pub</b>	Per 100 sq.m	190	0	0	5	3
<b>Community Hall</b>	Per 100 sq.m	580	2	1	3	1
<b>Children's Nursery</b>	Per 100 sq.m	350	6	3	2	5
<b>Eco Business Centre + B1 Office</b>	Per 100 sq.m	2,900	69	5	6	57
<b>Total</b>			<b>166</b>	<b>161</b>	<b>122</b>	<b>139</b>

## 7.2 Containment of Trips

It is recognised that the Exemplar Site, as the first phase of the Eco Town, will not include a full range of employment to 'contain' vehicle trips within the site, in comparison to the full Masterplan. Nevertheless, alongside the residential development will be a primary school, children's nursery, foodstore, pharmacy, public house, community centre/ multi faith centre, allotments, public open space and an eco business centre. Many of the day to day needs of residents will thus be met within the site. Whilst people will still 'travel' to them, these trips will predominately be on foot or cycle and will not take place on the external road network.

The level of likely containment of household vehicle trips has been estimated for each journey purpose and proportioned for total trips made per household in a day, as shown in **Table 21**. The overall containment level for the Exemplar Site is estimated as **17.4%**.

**Table 21: Estimated Containment of Trips within Exemplar Site**

Trip Purpose from Household	Proportion of Total Trips (2007 Bicester Travel Diary Survey)	Level of Containment (Estimated)
Place of work	0.28	5%
On employers business	0.09	0%
Educational attendance	0.17	30%
Shopping	0.18	30%
Other services	0.08	30%
Visiting friends/ relatives	0.09	10%
Recreation/ leisure	0.11	20%
<b>Total</b>	<b>1.00</b>	<b>17.4%</b>

## 7.3 External Traffic Generations

Using the estimated total level of containment for the Exemplar Site (**17.4%**) as a reduction on total traffic movements would result in the traffic generations on the external road network as presented in **Table 22 and Table 23** for 2016 and 2016 respectively. The traffic generations have been derived by applying the reduction factor of **17.4** (to reflect containment) to the development traffic generations presented in **Table 19 and Table 20** respectively.

**Table 22: Forecast Development Traffic Generations, 2016**

Land Use(s)	Morn Peak (8-9am)			Evening Peak (5-6pm)		
	Arr	Dep	Tot	Arr	Dep	Tot
<b>Residential - Private</b>	21	76	97	54	31	85
<b>Residential - Affordable</b>	8	28	36	20	11	31
<b>Primary School</b>	19	4	23	0	1	1
<b>Local Shops</b>	37	34	71	23	24	57
<b>Eco Pub</b>	0	0	0	5	3	8
<b>Community Hall</b>	2	1	3	3	1	4
<b>Children's Nursery</b>	5	2	7	2	5	7
<b>Eco Business Centre + B1 Office</b>	61	5	66	6	50	56
<b>Total</b>	<b>153</b>	<b>150</b>	<b>303</b>	<b>113</b>	<b>126</b>	<b>239</b>

**Table 23: Forecast Development Traffic Generations, 2026**

Land Use(s)	Morn Peak (8-9am)			Evening Peak (5-6pm)		
	Arr	Dep	Tot	Arr	Dep	Tot
<b>Residential - Private</b>	19	69	88	50	29	79
<b>Residential - Affordable</b>	7	25	32	18	10	28
<b>Primary School</b>	19	4	23	0	1	1
<b>Local Shops</b>	29	27	56	18	19	37
<b>Eco Pub</b>	0	0	0	5	3	8
<b>Community Hall</b>	1	1	2	2	1	3
<b>Children's Nursery</b>	5	2	7	2	5	7
<b>Eco Business Centre + B1 Office</b>	57	4	61	5	47	52
<b>Total</b>	<b>137</b>	<b>132</b>	<b>269</b>	<b>100</b>	<b>115</b>	<b>215</b>

# ATTACHMENT 3

EXTRACT FROM TFL PEDESTRIAN COMFORT GUIDANCE (2019)

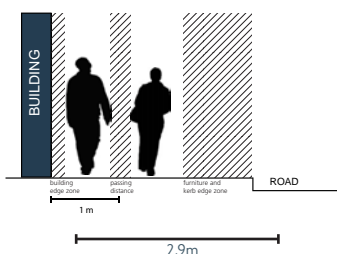
# Appendix B: Recommended Widths

This diagram shows recommended footway widths for different levels of flow, based on the research carried out for this project. They show the total width of the footway rather than the clear footway width.

This information provides an initial indication as to comfortable footway widths in different environments in advance of a full Pedestrian Comfort Assessment.

Pedestrian comfort levels are defined on Figure 8 on page 13.

Low Flow  
< 600 pph

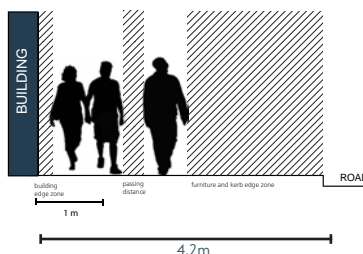


The recommended minimum footway width (total width) for a site with low flows is **2.9 m**. This is enough space for comfortable movement and a large piece of street furniture such as guard rail, cycle parking (parallel with the road), a bus flag for a low activity bus stop or a busy pedestrian crossing.

In high street or tourist areas the total width can be reduced to **2.6m** if there is no street furniture (except street lights) to allow space for people walking in couples or families and with prams etc.

In other areas, low flow streets can be **2m** wide if there is no street furniture. This total width is required for two users to pass comfortably and to meet DfT minimum standards.

Active Flow  
600 to 1,200 pph

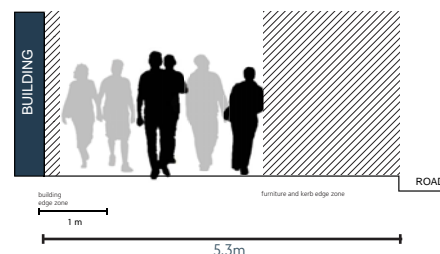


The recommended minimum footway width (total width) for a site with active flows is **4.2m**. This is enough space for comfortable movement and a large piece of street furniture such as a wayfinding sign, a bench or a bus shelter.

In high street or tourist areas the width can be reduced to **3.3m** if there is no street furniture (except street lights). This width allows two groups to pass.

In other areas, active flow streets can be **2.2m** wide if there is no street furniture. This width is required for the level of flow and to meet DfT minimum standards.

High Flow  
> 1,200 pph



At this level of flow the recommended minimum footway width (total width) is **5.3 m**. This is enough space for comfortable movement up to 2,000 pph and a large piece of street furniture such as a wayfinding sign, a bench, a bus shelter or a busy pedestrian crossing.

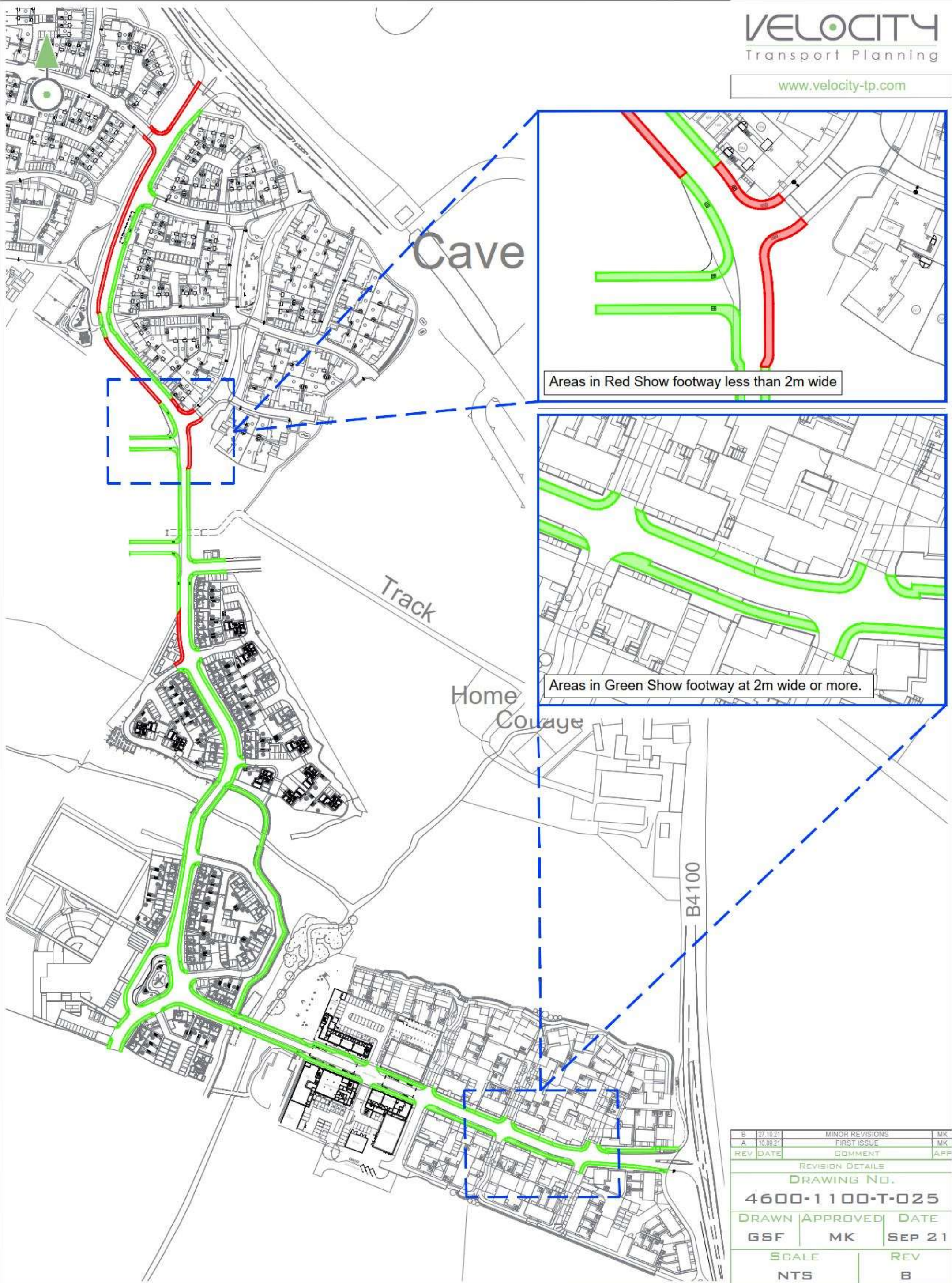
In areas such as transport interchanges more space may be required if there are multiple bus stops on one footway. See Appendix B: Street Furniture on page 26 for more information.

If there is no street furniture, the width can be reduced to **3.3m**. This is enough space for comfortable movement up to 2,000 pph.

# ATTACHMENT 4

VTP DRAWINGS





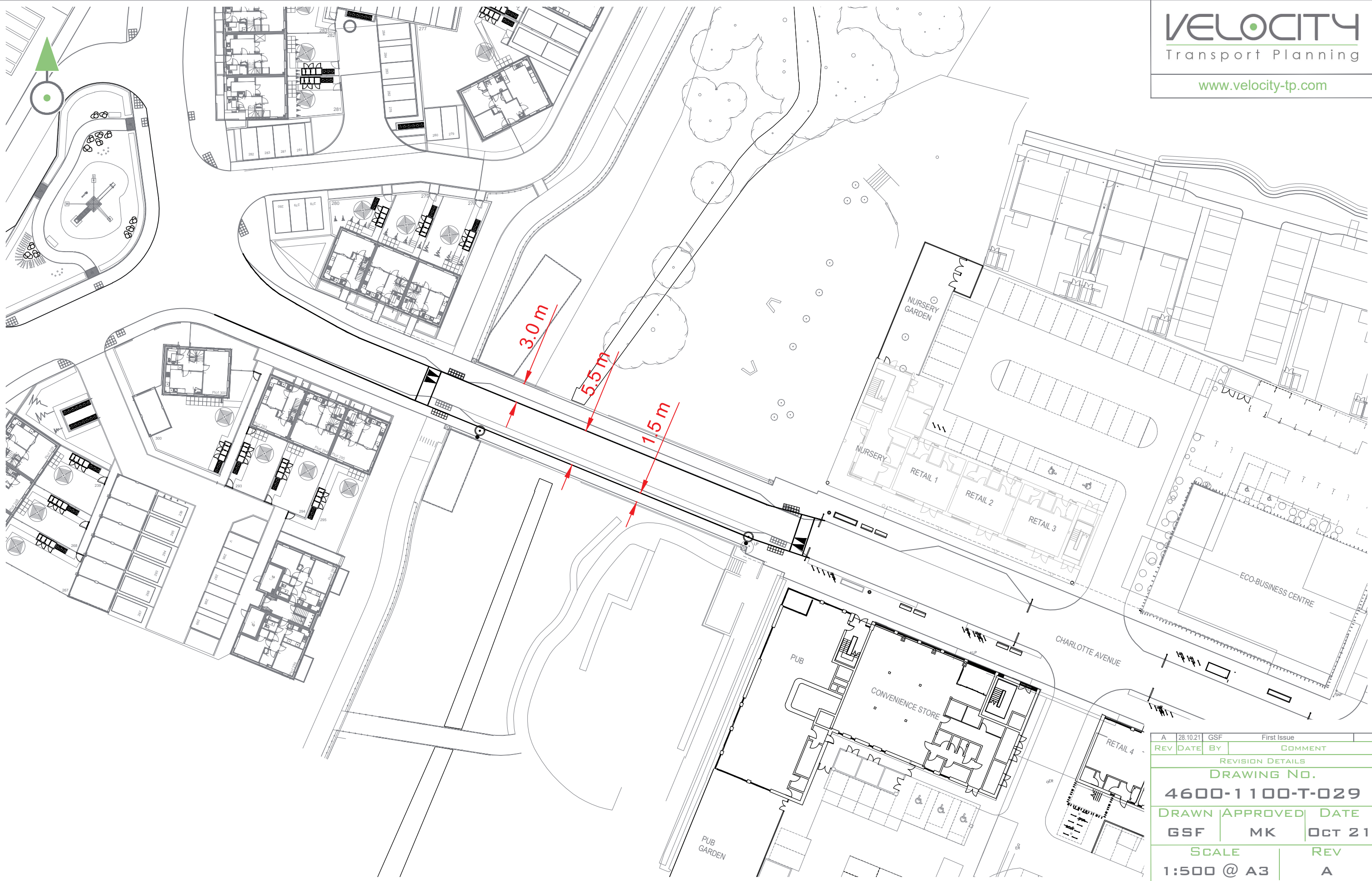
Areas in Red Show footway less than 2m wide

Areas in Green Show footway at 2m wide or more.

B	27.10.21	MINOR REVISIONS	MK
A	10.09.21	FIRST ISSUE	MK
REV	DATE	COMMENT	APP
REVISION DETAILS			
DRAWING NO.			
<b>4600-1100-T-025</b>			
DRAWN		APPROVED	DATE
GSF		MK	SEP 21
SCALE		REV	
NTS		B	







A	28.10.21	GSF	First Issue
REV	DATE	BY	COMMENT
REVISION DETAILS			
DRAWING NO.			
<b>4600-1100-T-029</b>			
DRAWN		APPROVED	DATE
GSF		MK	OCT 21
SCALE			REV
1:500 @ A3			A

CLIENT  
**FIRETHORN TRUST**

PROJECT  
**NW BICESTER**

DRAWING TITLE  
**BRIDGE FOOTWAY PROVISION**

